

Construction Methods AND EQUIPMENT

AUGUST, 1956

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In Denver 400,000-yd excavation for deep building foundation goes on around heavy bracing . . . p. 50

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A SUPERHIGHWAY BRIDGE

...takes shape in Texas



Texas is moving at a rapid rate with modernization of its superhighway network. Hundreds of miles of smooth thoroughfares are being planned and constructed.

This bridge under construction will connect Houston via superhighway to Beaumont. Built by Elmer C. Gardner, Inc., Houston, Texas, the choice of wire rope to lift the heavy girders into place was Yellow Strand Wire Rope.

Yellow Strand Wire Rope is the economical solution for many construction firms the country over. On shovels, draglines, dozers, it's proving itself for long service life, dependability, rock-bottom economy.

Another advantage of Yellow Strand is its availability through a nation-wide network of nearby distributors. Factory branches and warehouses are also strategically located for fast service to your wire rope needs. Ask your Yellow Strand Distributor to engineer your next job where wire rope is needed.

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Manufacturers of Wire Rope for 80 Years

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American Logging Tool Corporation is a subsidiary of Broderick & Bascom Rope Co.

B.F. Goodrich



How all-nylon Super Traction tires pull contractor through the big, tough jobs

SUGDEN & SIVIER, INC., operate 150 vehicles, including dump and transit mix trucks, semi-trailers, scrapers and graders, out of Oak Park, Michigan. The unit above is at work on a slag grading job at the Detroit Sewage Treatment Plant where both traction and flotation are all-important.

That's why this contractor chooses

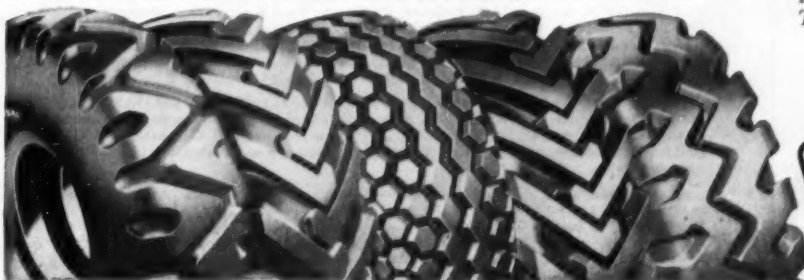
B. F. Goodrich *all-nylon* Super Traction tires. They pull through the big, tough assignments and do an "all-around job", the company reports. Thick Super Traction cleats take a deep bite, give positive traction. The wide tread makes a big footprint to give greater flotation in soft going. And under the tread is the B. F. Goodrich *all-nylon* cord body.

Nylon withstands double the impact of ordinary cord materials, resists heat blowouts and flex breaks. That's why the B. F. Goodrich *all-nylon* cord body outwears even the extra-thick Super Traction tread, *can still be recapped over and over!*

Your B. F. Goodrich retailer has the big, tough tires for your off-the-road work. Let him show you the ones that will save you money. Or write B. F. Goodrich Tire Co., A Division of The B. F. Goodrich Co., Akron 18, Ohio.

Specify B. F. Goodrich tires when ordering new equipment

There's a B. F. Goodrich tire for every construction job



Your B. F. Goodrich retailer is listed under Tires in the Yellow Pages of your phone book

You Only Need a Hand To Torque Properly!

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Just set the micrometer-type handle—the wrench releases automatically at the exact torque you want. No troublesome clicks, dials, scales or pointers. It's fast, accurate, rugged! 27 models, ranging from 5 to 4800 in.-lbs. and 5 to 500 ft.-lbs.—with plain or ratchet head. Buy them from your PROTO dealer today! Send 10¢ for catalog of entire line to
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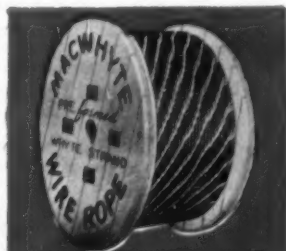
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Whether you need rope for scrapers, draglines, shovels, dozers, etc.—you'll find the Rope you need recommended in Booklet 8325. Ask for your free copy from your Macwhyte distributor.

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Waterstop in place in seconds!



LABYRINTH WATER-STOP after first pour has been made and form removed. The grooves receive the concrete from the second pour, providing an interlocking joint.

Just a few seconds were needed to nail this LABYRINTH WATERSTOP to the form...just a few seconds and water seepage worries were over before they could ever have a chance to start. LABYRINTH WATERSTOP forms a waterproof bond between two pours. The corrugated ribs bond firmly with the concrete. LABYRINTH WATERSTOPS are made of flexible polyvinyl plastic... that has superior weathering qualities, is not affected by temperature changes and chemical activity. LABYRINTH WATERSTOPS are easy to work with, can be cut to any desired length. "L" and "T" joints can be welded with just a hot knife. Find out now how your costs can be cut...and end your seepage problems. Just mail the coupon to:

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August, 1956

Pay Dirt in This Issue

Deep Foundation Requires Heavy Bracing..... 50

Building any foundation 50 ft deep is tough. Dewatering and bracing the site makes this job doubly tough.

Concrete Carts Run on Monorail..... 54

Self-propelled concrete carts running without operators on monorail cut \$2 a yd from concrete handling costs.

Saws on Tracks Strip Granite Facing..... 56

Two-man crew operates standard masonry saw mounted on job-built frame. Saw cuts granite with 50% time saving.

St. Lawrence Powerhouse Rising Fast..... 62

Concrete is building up around 16 huge draft tubes. Gantry cranes soon will be placing 25,000 cu yd each week.

Batch Plant Takes a Trip..... 83

Minnesota contractor hauls 135-ton batch plant, tall as a seven-story building, 2.1 mi in less than six hours.

Beardsley Dam—a One Season Earthfill..... 92

Forces work under a full head of steam in California's Sierra Nevada to place 3,330,000 yd of fill this summer.

Marble Chips Face Precast Panels..... 100

Casting marble-faced concrete sandwich panels for outside walls of government building makes cheap stone substitute.

Producing Aggregates..... 117

Construction Methods this month begins a series written by leaders in the field on the production of aggregates.

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NEXT MONTH

Deep well pumps combined with three stages of wellpoints tackle a huge dewatering job near the banks of the Mississippi River. The system removes up to 51,000 gpm from a 40-acre excavation in flat delta country.

NEW

HYDRAULIC MULTIFOOTE Speeds Paving on the Indiana Turnpike

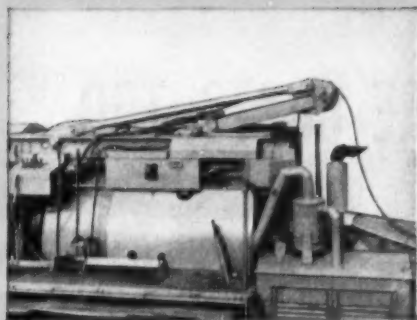


Some of the first concrete poured into the road forms on the west end of the Indiana Turnpike was from the fast operating bucket of the new Blaw-Knox MultiFoote Paver. Other Blaw-Knox paving equipment such as the road forms, spreaders, finishers, subgraders, batch plants and older MultiFoote Pavers are helping contractors meet the November 15, 1956 opening of this new turnpike.

This newly redesigned MultiFoote Paver with hydraulic controls and faster skip operation is giving owners faster cycle time *plus a new low overall clearance height*. The new MultiFoote Paver has all the advantages of single-cable skip control with its hydraulically controlled A-Frame (see left). Hydraulic controls and faster skip operation have stepped up the high capacity of the Blaw-Knox MultiFoote Paver even more so it can put out more concrete than with any other paver!

All the features that have made MultiFoote Pavers the leaders in their field have been retained or improved. The efficient double-cone drum is always balanced—*whether it is loaded or empty*. Simplicity of design provides the easiest possible access for service or maintenance. Shovel-type crawlers with their self-cleaning action provide the longest life, best flotation and positive traction. High operator's platform provides an unobstructed view of skip and bucket at all times.

If you are bidding on any paving job, see your Blaw-Knox distributor for complete details on the New Blaw-Knox MultiFoote and other paving equipment.



The A-Frame is raised and lowered by a fast acting hydraulic cylinder. In the down position, as shown above, the overall height is instantly reduced to clear bridges or overpasses. This hydraulic control allows the MultiFoote to retain all the advantages of single cable operation.

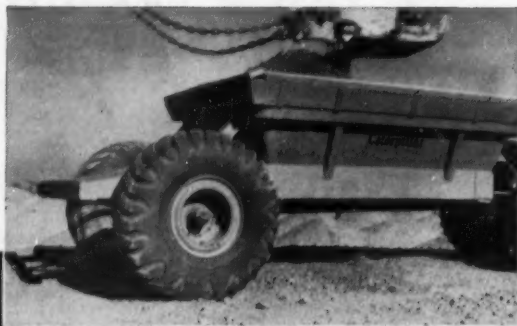


BLAW-KNOX COMPANY

Construction Equipment Division

38 Charleston Ave., Mattoon, Illinois

**Nylon cord tires reduced
off-the-road tire failures...**



NOW NYLON CUTS TRUCK TIRE COSTS, TOO



M. C. TRENT,
Vice Pres., F. M. Reeves & Son, Inc.
Roswell, N. M., reports:

"When we found how well nylon cord tires stood up on off-the-road units, we started using them on our trucks, too. That was two years ago. Since using

nothing but nylon cord tires, we haven't had a single tire failure!

Nothing but Nylon

"We haul concrete, sand and gravel, so our equipment gets a beating both on and off the road. We're so pleased

with the way nylon cord tires have worked out that we use nothing else—on old or new equipment."

PROVE TO YOURSELF that nylon cord truck tires give more mileage, more retreads—lowest cost per mile. Ask your dealer about nylon cord truck tires today. (Du Pont makes the tough nylon yarns, does not produce tires.)

DU PONT NYLON for TIRE CORD



BETTER THINGS FOR BETTER LIVING
... THROUGH CHEMISTRY

REG. U. S. PAT. OFF.



**NOW . . . IN PASSENGER-CAR TIRES, TOO . . . THE STRENGTH OF NYLON . . .
FOR UTMOST SAFETY . . . SUREST PROTECTION AGAINST TIRE TROUBLE**

What is the Crane Combination **YOU** need?

NORTHWEST Crane Equipment is so designed as to meet any crane problem you may have. There is a wide range of boom hoist equipment. Mast-type gantry with the sectional boom hoist rigging and pendent lines make possible ease of adjustment to boom length changes. You have a choice of two or three sheaves at the boom point. Adjustable jib, telescopic boom struts, removable counterweight, extended boom point sheave shaft for piledriver leads—all can be had to meet your requirements. And, if you need long crawlers and wide treads, they're available.

STANDARD BOOM HOIST

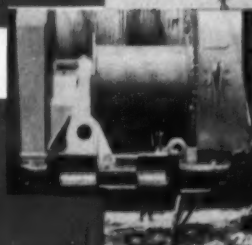
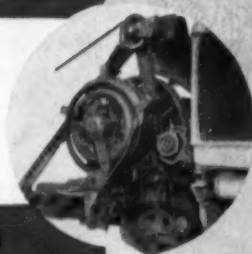
The Northwest Standard Boom Hoist is a self-locking worm gear boom hoist running in an oil bath and it operates under power both up and down. It is safe, smooth, positive!

INDEPENDENT HIGH-SPEED BOOM HOIST

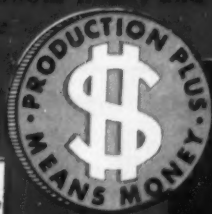
The Northwest Independent High-Speed Boom Hoist is independent of all other operations and permits booming with power controlled lowering without sacrificing either of the main drums. It is a rugged, heavy-duty unit capable of hour in and hour out operation. There is no finer, more reliable hoisting assembly.

THIRD DRUM

The Northwest 3rd Drum operates independently of the main drums and is fitted with its own clutch and brake. It makes possible 3 load lines with a standard worm boom hoist; and 3 load lines with the independent high-speed boom hoist.



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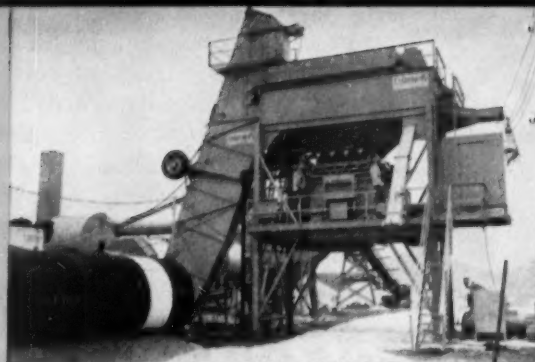
88%

of all Aggregate and Bituminous Plants on Kansas Turnpike

28 OUT OF 32 PLANTS DEPEND ON CEDARAPIDS for the equipment that can best meet exacting turnpike specifications. Along the 236 miles of Kansas Turnpike, 25 aggregate producing plants are turning out over 12,000,000 tons of rigidly specified base rock, granular subbase, sand, gravel, etc. *All but two of these plants use Cedarapids crushing or screening equipment!* Out of seven bituminous mixing plants supplying asphaltic concrete, *five are Cedarapids!*

THE NEW HIGHWAY PROGRAM

... with its 40,000-mile interstate system built to increasingly rigid specifications, will see more and more contractors turning to Cedarapids for equipment that's been proved on the Kansas Turnpike for maintaining a profitable production pace in the toughest production conditions.



Five G60's Supply Most of The Asphaltic Concrete

Five big Cedarapids G60 Bituminous Mixing Plants are meeting exacting KTA specifications with the volume demanded by an undertaking of this size. The fact that five of the seven bituminous mixing plants on the Kansas job are Cedarapids Model G60's indicates how contractors feel about this all-automatic plant's thorough mixing and accurate batching, ability to take up to 7500-lb. batches, and profitable production of up to 180 tons per hour.



RENO CONSTRUCTION CO. PRODUCES 250 TONS PER HOUR

Using a Cedarapids Portable Double Impeller Impact Breaker Primary, a scalping screen unit, and a Portable Hammermill Secondary to produce KTA specification aggregate, Reno Construction Company's production ranges between 200 and

250 tons per hour. The Overland Park, Kansas, contractor is operating two Cedarapids Unitized Plants near Aikman and a G60 Bituminous Mixing Plant near Chelsea. Reno owns many other Cedarapids portable units as well as stationary plants.

SEE YOUR CEDARAPIDS DISTRIBUTOR FOR HELP WITH YOUR TURNPIKE PROBLEMS

The Cedarapids Line of Equipment Includes:

PORTABLE AND STATIONARY CRUSHING, SCREENING AND WASHING PLANTS FOR STONE, GRAVEL AND SAND • BELT CONVEYORS • VIBRATOR AND REVOLVING SCREENS • FEEDERS • HAMMERMILLS • DOUBLE IMPELLER IMPACT BREAKERS • BATCH TYPE AND CONTINUOUS TYPE BITUMINOUS MIXING PLANTS • DRIERS • DUST COLLECTORS • VIBRATING SOIL COMPACTION UNITS • MOTORIZED HEAD PULLEYS

Built by Iowa... Sold the World Over

use CEDARAPIDS EQUIPMENT

Difficult Specification Problems Solved by Contractor Ingenuity and CEDARAPIDS Versatility

Meeting the toughest turnpike specs yet was complicated by extremely difficult crushing conditions. Some native limestone, with 8% moisture content, tends to pack rather than crush. In some quarries, clay topsoil in the material makes it difficult to meet specified PI limits. A common problem was getting rid of the high percentages of dirt and objectional fines encountered.

To lick these problems, many con-

tractors turned to *breaking*, instead of crushing, the saturated, rubbery rock with Cedarapids Double Impeller Impact Breakers . . . wasting contaminating fines before primary crushing by use of Cedarapids vibrating grizzlies discharging onto waste conveyors . . . using Cedarapids Portable Screening Units or Screens ahead of secondary crushers to scalp off objectional fines . . . combining flexible Cedarapids washing equipment to produce clean aggregate.

Kansas Turnpike Aggregate Specifications

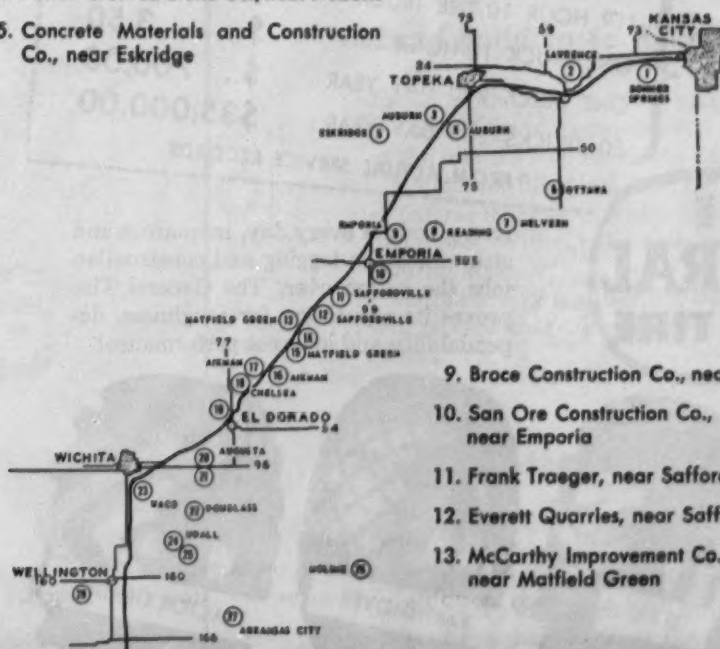
Screen	Sub-Base Rock (% Passing)	Base-Course Rock (% Passing)*
2 in.	100	100
1½ in.	100-75	100-70
1 in.	100-60	100-60
½ in.	95-45	
¾ in.		95-39
No. 4	80-25	75-25
No. 10	65-17	55-17
No. 40	40-8	30-8
No. 200	10-0	10-0

CEDARAPIDS OWNERS ON THE KANSAS TURNPIKE

1. Loring Quarries, near Bonner Springs
2. B. L. Anderson, Inc., near Lawrence
3. Weaver Construction Co., near Auburn
4. Patton Crushed Stone Co., near Auburn
5. Concrete Materials and Construction Co., near Eskridge

6. Concrete Materials and Construction Co., near Ottawa
7. Dusenbury Quarries, near Melvern
8. Nelson Brothers, near Reading

14. McCarthy Improvement Co., near Matfield Green
15. Dillon Stone Company, near Matfield Green
16. Reno Construction Co., near Aikman
17. Reno Construction Co., near Aikman
18. Reno Construction Co., near Chelsea
19. George Meyers Inc., near El Dorado
20. Badger Material Co., near Augusta
21. Amis Construction Co., near Augusta
22. Carr Rock Products Co., near Douglass
23. Imperial Paving Co., near Waco
24. H. D. Youngman Construction Co., near Udall
25. Anderson Oxandale Crushed Stone Co., near Udall
26. Concrete Materials and Construction Co., near Moline
27. San Ore Construction Co., Arkansas City
28. Peter Kiewit Sons' Co., near Wellington



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PER HOUR 10-TIRE TRUCK

\$... 0.35

ONE TRUCK 10-HOUR DAY

\$... 3.50

ONE TRUCK 200 DAY YEAR

\$... 700.00

50 TRUCKS-200 DAY YEAR

\$35,000.00

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Construction News from Washington . . .

**Washington, D.C.
August, 1956**

Congress Boosts Construction

In this session of Congress, the construction industry came out tremendously well—with the biggest peacetime public works program in history handed to it.

Foremost of the items in this richest of all packages is, of course, the highway construction program—\$27 billion for the interstate system, plus increased money for other federal-aid roads.

Then, there's river development. Congress voted money to start construction of projects—such as the Upper Colorado Project, the biggest of this lot—that will ultimately cost more than \$2 billion. The session also authorized future projects—without making money available at this time—that carry a likely price tag of another \$1.5 billion.

Finally, there is another \$2 billion or so in military construction. This does not include \$1 billion worth of family housing to be built on military basis with private financing.

Road Building to Roll Fast

Impact of the new highway program will be felt very soon. Already the Secretary of Commerce has allocated bigger funds to the states as the first big step under the new highway law.

Result: for this fiscal year, the states now have available \$2 billion of federal money—to which they must add their own matching contributions. Without the new legislation they would have had only \$875 million.

Within a very few months, certainly before next Jan. 1, the states will receive their allocations for fiscal 1958. These will come to \$2.55 billion.

It's Up to the States

Several hundred millions worth of road projects are just about ready to advertise for bids. A telegraphic survey by Associated General Contractors indicates that \$400 million in contracts could be awarded by the year's end. This \$400 million is in addition to what the states would have done without the new law.

The question that occurs most frequently is: Can the states maintain this rapid rate of acceleration? The Bureau of Public Roads thinks they can—and on a schedule that will bring the building program to a peak (to be maintained for a dozen years) by 1960.

(Continued on next page)

No Delay on Wage Determinations

Davis-Bacon provisions of the highway law won't delay advertising of interstate projects. Federal officials look for quick government action on minimum wage rates. Wage determinations are nothing new to state highway departments. They needed only a firm procedure to speed their new cooperation as consultants to the Secretary of Labor on predetermining labor rates for jobs in the interstate system. Contractors look to this requirement of the new law to keep wage rates in line.

Materials Demand to Rise Rapidly

The highway program will make a huge draw on materials. Cement requirements will go up some 21,000,000 barrels to a total of 94,500,000, the Bureau of Public Roads says.

Steel consumption is likely to rise more than 600,000 tons to more than 3,300,000,000.

Structurals will go up some 300,000 tons, primarily for bridges. This will put a pinch on an already tight structurals situation. The government still has not decided whether to stimulate new capacity expansion by granting fast tax writeoff certificates.

Business Outlook—Still Fine

New construction will outdo 1955, even though housing is still on a lower level than last year. The annual rate in the spring was only \$100 million below the 1955 rate, and government experts see a resurgence big enough to pass the \$32.7 billion total of last year. Big factors are industrial and commercial buildings, schools, and highways. But some other areas are having a boom, too:

Public water supply requirements will increase by 14%.

Public sewerage and pollution abatement construction is now 15% above last year.

A new pollution law will stimulate additional business by the nation's cities. The Budget Bureau has approved \$50 million of funds to be distributed by the U. S. Public Health Service in grants for building municipal treatment facilities in the next 11 months. The federal grants were authorized as a beginning of a 10-year program that Congress voted late in the session.

More Pay for U. S. Engineers

Higher pay for the government engineers who do the necessary advance work on construction projects is now in effect. The biggest problem has been in the middle grades: Starting pay for civil engineers is now \$6,115, up from \$5,440, the next step is up from \$5,915 to \$6,590, and the next is up from \$6,390 to \$7,035. Of course, the new scales probably also will have some effect on the general salary level of engineers in private work.



PUT A POLISHED TEXTURE like this on all surfaces of your precast concrete products every time by spraying your forms with Poco Soluble Compound.

NEW FORM LUBE BANS BUBBLES IN CONCRETE for $\frac{1}{10}\text{¢}$ per sq. ft.

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surfaces with polished texture on concrete work**

Now you can eliminate air bubbles from surfaces of precast concrete products—even the underside of beams and channels—with a new form lubricant . . . Poco Soluble Compound.

It's the sure way to get smooth surfaces with a polished texture on all of your concrete work for an average cost of approximately $\frac{1}{10}\text{¢}$ per sq. ft.

Just mix this exclusive Pure Oil product with water and apply to your forms with a pressure spray. A hand garden spray can be used for application providing air

pressure is sufficient to properly mix the air and solution.

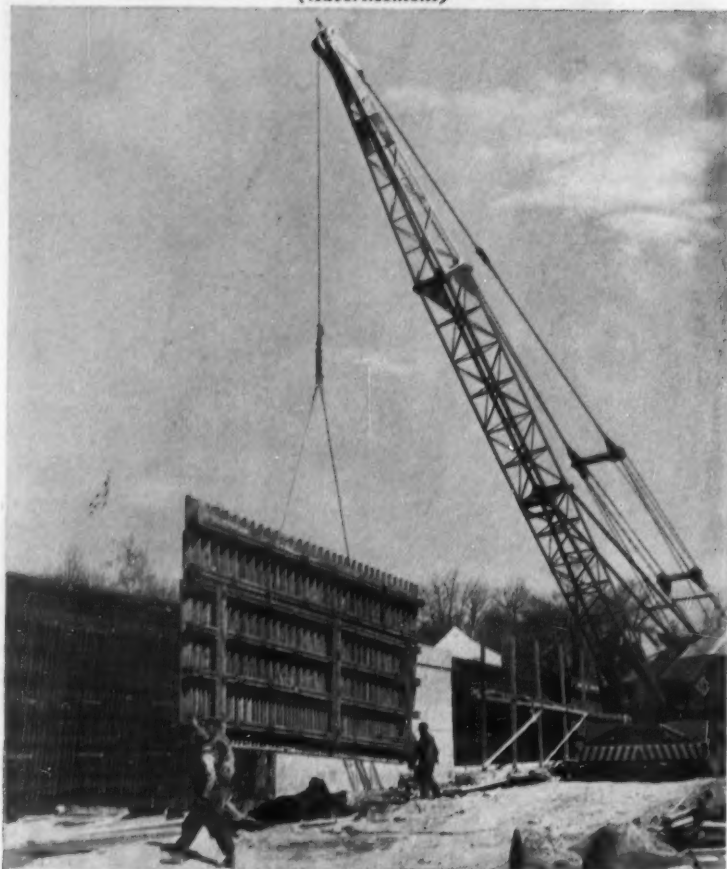
Contractors and concrete products manufacturers are mixing Poco Soluble Compound and water in various ratios from equal parts to one part of compound and six parts of water by volume.

Call your local Pure Oil representative today for full information on amazing new Poco Soluble Compound. He'll recommend the proper mixture for your operation and show you how it will increase the appearance and saleability of your concrete products.



Be sure with Pure

(Advertisement)



Form being moved into position. Back wall form, reinforcing steel, Richmond Tyscrus, are all in place. After front form—which consists of two telescoped panels—has been set down, bolts connecting the panels are loosened so that upper panel can be raised and tilted by crane to required height and shape. Pre-cut plywood will fill gap between two panels. When form is positioned, work-

men hook plank scaffolding to walers, fasten $\frac{1}{4}$ " Richmond Tyscrus with seven or eight quick turns. Contractors: Corbetta-Yonkers Contracting.



2-strut, $\frac{1}{4}$ " Richmond Tyscrus

Pours Speeded with New Form Method and Richmond Tyscrus

Three miles of retaining walls were needed where the southern end of the New York Thruway cuts through Yonkers. No two sections of the wall are alike; they differ both in height and slope of coping. Corbetta-Yonkers speeded construction by a combination consisting of the use of ingenious telescoping panels fabricated at their yards—and 12,000 lbs. safe load (.340 HT Steel) Richmond Tyscrus for their assembly.

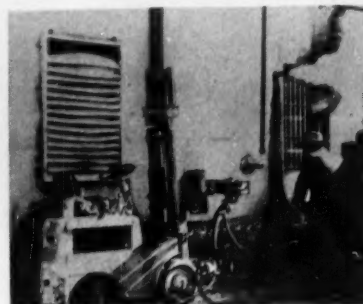
Assembling method is described above. The whole process took less than one hour. Stripping the form was just as easy, with the Tylag backed out of the form. Richmond Tyscrus helped cut costs in other ways too: their built-in extra strength (published load 12,000 lbs.; ultimate strength 20,145 lbs.) means that you can pour fast and

heavy in all weather. There is only one threaded connection, with a coarse thread which is self-cleaning when removed from the concrete. Richmond Tyscrus are far more economical than conventional ties.

The new Richmond Handbook describes the full line of Richmond-engineered tying devices. Write for your copy. Or, if you have a specific concreting problem, Richmond's Technical Division or field men will be glad to submit recommendations, drawings and proposals. Write RICHMOND SCREW ANCHOR COMPANY, INC., 816 Liberty Avenue, Brooklyn 8, N. Y. or 315 South Fourth Street, Saint Joseph, Mo.



Job Talk...



Fork Truck Mounts Drill

A fork truck is providing a maneuverable drill setup for removing the Pulaski County (Ark.) jail from the path of a new superhighway. Mural & Son, Cleveland contractor, mounted a drill on a Clark 1,000-lb fork truck and supplied air from a Chicago-Pneumatic compressor.

Technique for moving the 4,000-ton jail to a new site involves drilling holes through a reinforced concrete foundation to admit a load-carrying grid of I-beams. Grid will rest on rollers and tracks during moving.

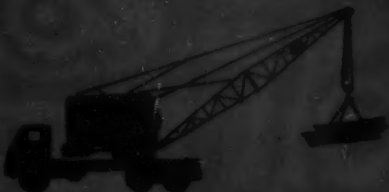
A lower row of 2-in. holes is drilled, then concrete between holes will be burned away to free the structure. The Clark fork truck provides fast elevation for drilling grid holes and easy moving of the rig along the foundation lines.



Loader Pays Off on Street Grading


Maneuverability plus rubber-tire mounting make the Payloader an ideal tool for street grading, ac-

(Continued on page 20)



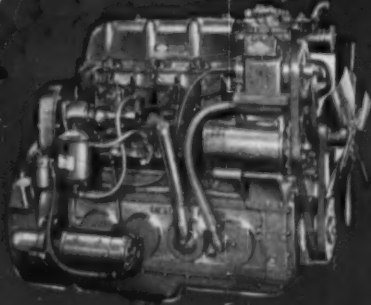
Industrial Type—
P&H Diesel for
Crane "Upper"





For the Complete Powering of Truck Cranes...

Automotive Type—
P&H Diesel for
Crane Carrier



IT PAYS TO STANDARDIZE ON P&H DIESELS

In the *past* Diesels have never been welcomed for the *complete* powering of truck cranes. Slow starting—stalling while idling—insufficient acceleration have proved handicaps to their acceptance, especially for powering of the carrier.

Now these limitations to the use of Diesels for *complete* powering have been totally overcome through new P&H product developments. Highly responsive P&H Engines—Series C-18 accelerate and decelerate as fast—idle as well without fouling or clogging—start in normal temperatures as quickly as a gas engine.

When you standardize on 2-Cycle P&H Diesels for *complete* powering, you get the right Diesel power for the right job. An Automotive Type-P&H Engine in the crane carrier takes you wherever a truck can go—gets you between jobs fast. An Industrial Type-P&H Engine in the crane "upper" helps you handle any crane assignment with plenty of slow, sure, steady power for maximum control, safety and production.

For the first time you can burn fewer gallons of low-cost Diesel fuel in *both* truck crane engines. Use of 2 similar type P&H Engines also results in easier understanding and better maintenance of *both* engines by *one* man. Savings are substantial, too, on parts inventorying and repair costs. All wearing parts are interchangeable between P&H Engines.

If you want money making and money saving power, it will pay you to investigate the *complete* powering of your truck cranes with P&H Diesels.

P&H Product Development Features In New Series C-18 P&H Diesels

For Quick Starts—automatic retarding of the fuel injection until P&H Engine speeds reach 500 r.p.m.

For Good Idling—use of P&H developed injector tips with a single, large hole to prevent fouling or clogging.

For Instant Response—new, simplified P&H fuel system providing fast acceleration and deceleration.

For Dependable Power—new P&H Power Assembly, new cooling system, new dual porting of cylinders for better combustion—more power.

For Less Down-Time—simplicity of P&H Diesel design, interchangeability of all wearing parts and the P&H "Unitized" Power Assembly.

P&H Diesel Engines are available in 2, 3, 4, and 6 Cylinder Models for the complete powering of truck cranes from 15 to 35 tons in size.

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DIESEL ENGINE DIVISION

Crystal Lake, Illinois

P&H Diesel
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model HH • 1 $\frac{3}{4}$ cu. yd.

more productive

This new, improved model HH is the finest tractor-shovel in its class ever offered. It has exclusive features that give it tremendous productive capacity for its size and enable it to *go* and *do* jobs where rubber-tire tractor-shovels couldn't operate before.

It handles easier and faster, and rides smoother, with or without a load, than any other make and can out-produce bigger machines. It has balanced design and durability throughout to do a big day's work day-after-day. Your "PAYLOADER" Distributor will be glad to demonstrate its superior performance and greater productive capacity.

Long-life, high-traction drive train: Heavy duty planetary final drives in the wheel hubs, and hypoid differential gearing keep torque low in axles . . . prolong life of axles and *all* drive train parts.

Hydraulic shock absorber: A shock absorber in the hydraulic system smoothes out the ride, permits faster load-carrying speeds over rough terrain — with less spillage.

More production, less effort: Power steer, power brakes (on all four wheels), power shift (no "clutching") and good riding qualities also lessen operator fatigue—promote full production all day.

1956 Industrial Design Institute top award for styling this "PAYLOADER", was presented to Jon W. Hauser of Jon W. Hauser & Associates.



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Bigger Loads . . . Less Spillage

Special pads on bottom of boom arms give ground support for powerful pry-out action—relieve the axles and wheels of these strains. Bucket can tip back 40 degrees, before raising, to get heaped loads quick and easy even in shallow cuts and low piles, and to retain heaped loads.



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The "Paylomatic" transmission in this unit is a complete power-shift type Hough-built expressly for "PAYLOADER" use. It gives instant finger-tip shifting—on the go. There's no stopping for a RANGE shift, no "clutching". The forward-reverse control can also be operated under full engine speed, in any gear . . . all this, plus torque converter drive.



More Reliable Traction

Four-wheel-drive traction is even more reliable on this unit, because it has torque-proportioning differentials—an exclusive "PAYLOADER" feature. The wheels with the best footing get the most power. You get traction and *action* on sand, mud, snow.



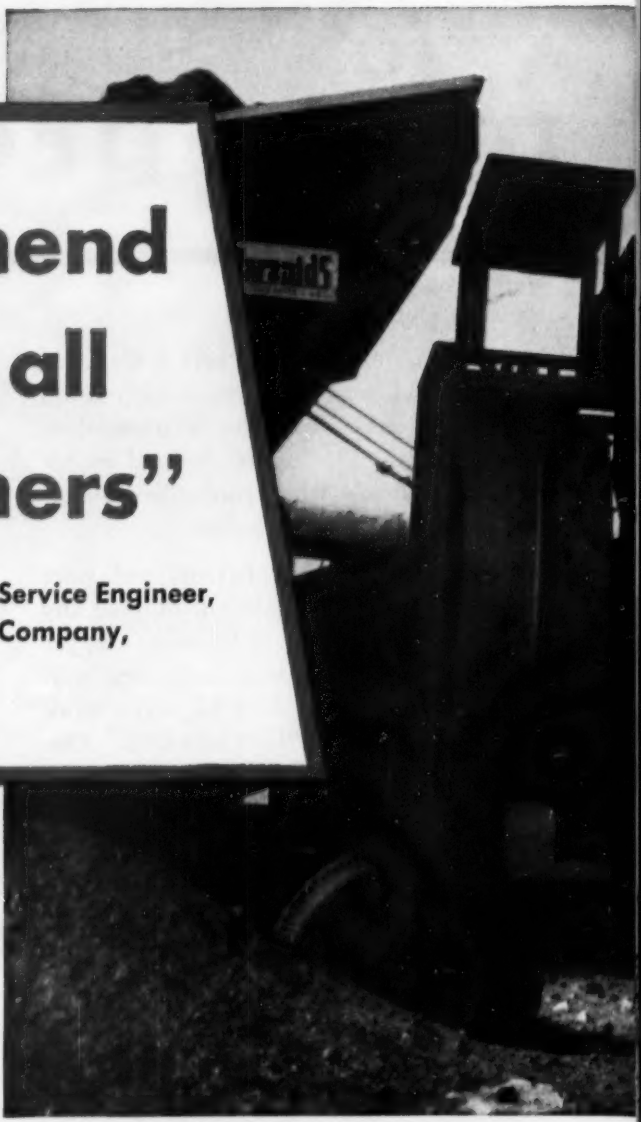
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**"We recommend
Texaco to all
our customers"**

**... Boyd Titsworth, Field Service Engineer,
Iowa Manufacturing Company,
Cedar Rapids, Iowa**

"We have been using Texaco for more than twenty years," says Mr. Titsworth. "Instruction plates on all 'Cedarapids' crushers, screens, driers, hammermills and other heavy duty equipment recommend Texaco exclusively.

"Texaco Marfak, for example, has always done an outstandingly fine job. Our long experience shows it to be the best lubricant for the heavy duty service, shock loads and high temperatures our equipment often meets on the job. That's why every piece of 'Cedarapids' equipment is *Marfak*-lubricated when it leaves our plant."

Mr. Titsworth expresses the findings of contractors everywhere—that *Texaco Marfak* really stays in the bearings and gives the tough, long-lasting protection that heavy duty equipment must have.

Let a Texaco Lubrication Engineer give you full

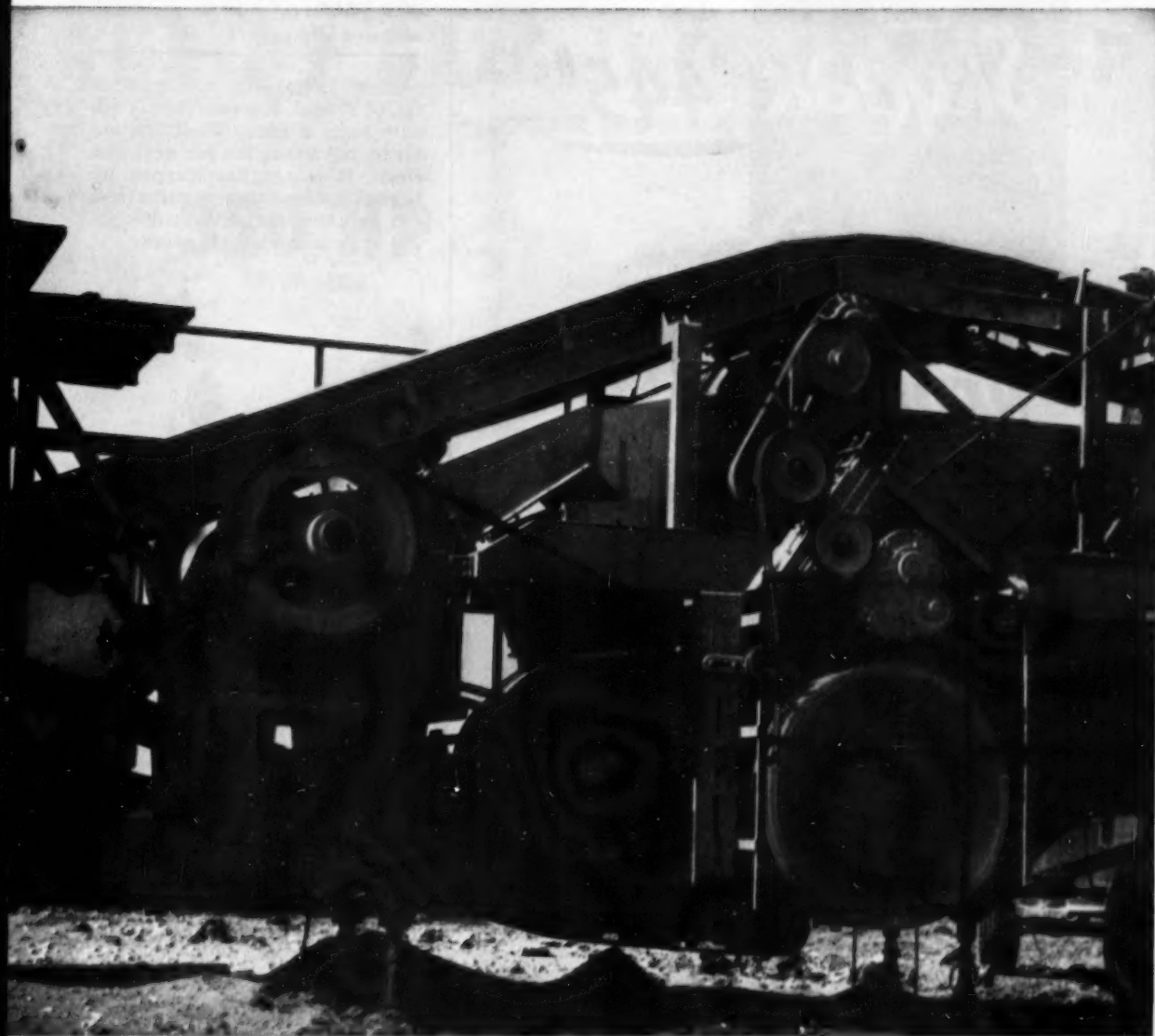
details and develop a Texaco Simplified Lubrication Plan for you. This will enable you to handle *all* major lubrication with *no more than six* Texaco products.

Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write:

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Texaco Marfak Heavy Duty—for wheel bearings—assures extra thousands of miles of protection because it seals out dirt and moisture, seals itself in. You enjoy longer bearing life, lower maintenance costs. No seasonal change required.

Texaco Marfak Heavy Duty Special 2—multi-purpose, lithium-base lubricant for chassis, wheel bearing, water pump and other grease lubrication. Pumps easily at winter temperatures, resists water washing and stands up in severest service.

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FOR ALL CONTRACTORS' EQUIPMENT



with brand new working conveniences and ALL the features you want... "built-on" years of masonry and field experience by the originators of the West System—the nationally used system for moving palletized masonry (and related) materials, with overall savings of 15% and more.

- Lifts over 20 ft. in 17 seconds—3000 lb. capacity
- Heavy duty welded boom and frame of double-strength pipe and plate construction; chrome plated hydraulic shafts
- Automatic self-leveling—adjustable, non-tilt forks
- Powered by new Minneapolis-Moline "445" Tractor
- Power steering . . . Ampli-Torq Transmission
- Improved flotation without ballast or Hydrofill. (Wheels, Axles and Oversize Tires engineered to the load each will carry)
- Double-Disc Brakes . . . Rear Wheel Drive
- Increased to 83 Horsepower
- Dependable — Versatile — Safe

The West SKYTRAK "445" when used in conjunction with the other components of the WEST SYSTEM . . . STANDARD AND HALF BRICK BUGGY, STANDARD AND HALF HI-LIFTS and MORTAR BUGGY, is the ONLY complete handling system to move materials from supplier to mason's work station.

Without cost or obligation, please send me full particulars on:

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☐ The West System—"Keep Masonry Materials on the Move"

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Firm _____

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WEST

BRICK BUGGY CORPORATION

4310 Mayfield Road Cleveland 21, Ohio

JOB TALK . . .

continued from page 14

cording to Douglas Construction Co. of Topeka, Kansas. The rig not only pulls a heavy 27-ft trailing blade, but keeps the job neat and clean. It is not handicapped by limited space between curbs and can go anywhere without damaging expensive concrete work.



Plexiglas Glazing Cuts Window Breakage

Several large Pennsylvania contractors have eliminated an expensive window breakage problem in their heavy equipment by substituting panes of transparent Plexiglas plastic for conventional safety glass.

Rough service, flying stones, carelessly handled tools, and door slamming were taking a heavy toll of glass windows, windshields, and enclosures in drag lines, shovels, trucks, and bulldozers. Breakage was particularly heavy in drag lines. In some cases, windows were being replaced as often as once a week. Estimated replacement cost for one contractor who operates a fleet of 50 vehicles ran several hundred dollars in a six-month period. During winter operations in the Pennsylvania hills, equipment had to be taken out of service immediately to replace broken windows in order to protect the operators from the intense cold.

Recognizing the problem, an enterprising plastics dealer, the Plastics Arts Co. of Wilkes Barre, Pa., came up with an answer that was adopted by the construction firms. As the original glazing became broken, it was replaced with 1/4-in. thick panes of transparent

To celebrate its first birthday

THE D9 GETS INCREASED HP

—more power for your operation!

320 HP

(FLYWHEEL)

formerly 286 HP

260 HP

(DRAWBAR)

formerly 230 HP



The giant Turbocharged CAT* D9 Tractor, which since its introduction last year has set new performance standards in the field, now packs more power than ever to handle even bigger jobs. Its drawbar capacity has been increased from 230 HP to 260 HP—its flywheel horsepower from 286 to 320!

This increase in power reflects Caterpillar's policy of leadership in action. Combining research with practical field experience, there's constant product improvement to meet your needs for bigger production at lower cost. This policy applies to *every* product in the Caterpillar line—Diesel Engines, Tractors, Motor Graders and Earthmoving Equipment.

Now, with its increased horsepower, you can give the D9 tougher jobs than ever before. To match your requirements, it's available with torque converter or direct drive with oil clutch. For complete details about the more powerful D9, see your Caterpillar Dealer. Name the date—he'll be glad to demonstrate!

Caterpillar Tractor Co., Peoria, Illinois, U.S.A.

CATERPILLAR*

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**D9—MORE POWERFUL
FOR BIGGER PRODUCTION**



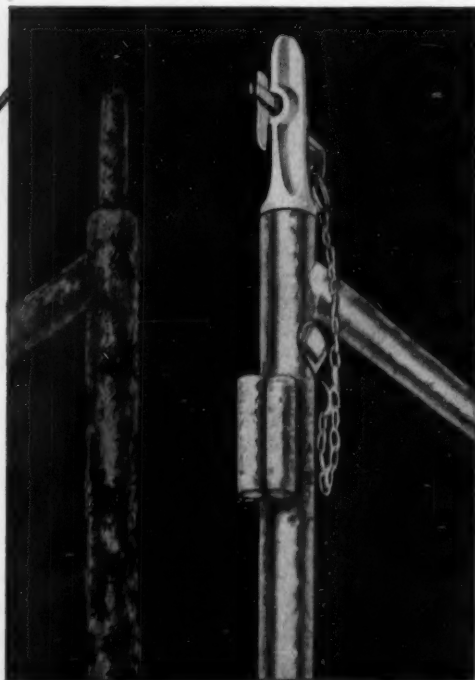
your
scaffolding
needs
"Skin
Protection"
too!

You've probably never thought about it in just that way, but it's true. With a protective "skin" placed over every single part of your scaffolding—one that would withstand the rigors of constant handling and exposure—these components would last years longer.

This added "skin protection" is now available in Universal Galvanized Scaffolding. Through a special chemical process known as *dichromate galvanizing*—a Universal exclusive—a lasting, lubricative coating is now applied to every single part of Ezebilt scaffolding which permits faster erection, eliminates rust, adds years to the work life of the scaffolding and looks better on the job. Best of all, these premium features come to you at *no extra cost*.

With the 'no-loose-parts' feature of Gravity-Lock construction and the extra *plus* of dichromate galvanizing, Universal offers the finest scaffolding available today. When next you order scaffolding, specify the only *galvanized* scaffolding—specify Universal Ezebilt.

Universal has a scaffold panel for every maintenance and mason need. For further complete information on dichromate galvanized Ezebilt, write today for our new 1956 catalog.



A PANEL STYLE FOR EVERY CONSTRUCTION AND MASON NEED
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principal cities. See local classified phone directories.

UNIVERSAL ^{*the only*} **GALVANIZED SCAFFOLD**

UNIVERSAL MANUFACTURING CORP. • ZELIENOPLE 6, PA.

JOB TALK ...
continued from page 20

Plexiglas, manufactured by the Rohm & Haas Co. of Philadelphia, Pa. The largest panel installed to date is 32x61 in. for a crane enclosure.

The cost of the acrylic plastic in the thickness and grade supplied is said to be about the same as that of double-strength safety glass.



Form Ties Threaded Over Welded Studs

End welded studs and coil form ties were employed by Webb & Knapp Construction Corp. to build the basement walls for the new Court House Square building in Denver, Colo. (See page 50.)

Large diameter Nelson studs were welded to soldier beams of basement cofferdam walls with a heavy-duty gun. Two battery units hooked in parallel provided power. The studs were 3/4 in. in dia and 6 in. long, with 5 1/2-in. of broad threads sized to fit the coils of Superior form ties.

Forms were secured by running 3/4-in. lag bolts through the waler and threading into the free end of the coil form tie. Concrete was placed directly against the cofferdam wall, eliminating the outside form. Prefabricated panels consisted of 10x4-ft 3/4-in. Plyform, with 2x6-in. studs 12 in. on centers. Walers consisted of 6-in. double channel iron, back to back.

Nelson studs were spaced 6 ft apart horizontally and 2 ft apart vertically. Theoretical load on each stud and tie was 12,000 lb. Two battery units supplying the power were mounted side by side on a single timber platform.

STANDARD OF THE INDUSTRY SINCE 1936

Luber-finer

FOR EVERY TYPE OF ENGINE EVERY TYPE OF OIL

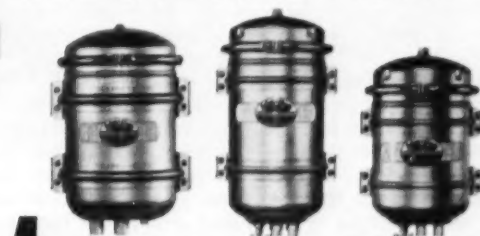


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Only a Luber-finer Filter Unit with a genuine Luber-finer Pack produces the patented filtering process that gives engineered protection to engine and oil as recommended by equipment manufacturers. The vital oil supply is circulated through Luber-finer's exclusive specially processed media which removes not only the injurious suspended solids from the oil but also the colloidal impurities which are often more damaging, thus increasing the life of both engine and oil. *The Efficiency of Luber-Finer's Patented Process has never been equalled!*

Luber-finer's patented filtering process adds thousands of miles to engine and oil life—cleaning—filtering—and returning the oil to the engine with the excellent lubricating qualities as specified by the manufacturers of today's modern high powered engines. Every minute—every mile your engine is run it must be protected.

Remember, there's a Luber-finer model especially designed for your type of engine or oil.



DON'T BE MISLED! ONLY GENUINE LUBER-FINER PACKS GIVE EXCLUSIVE ENGINEERED PROTECTION

DIESELPACK—Designed for use with H.D. detergent compounded oils. May also be used with fuel oils and straight mineral oil. Removes impurities and contaminants—without affecting the additives.

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The Refining Pack, which combines Adsorbent filtration, removes acids, moisture, suspended particles and colloidal impurities during its effective life more efficiently than any other filter.

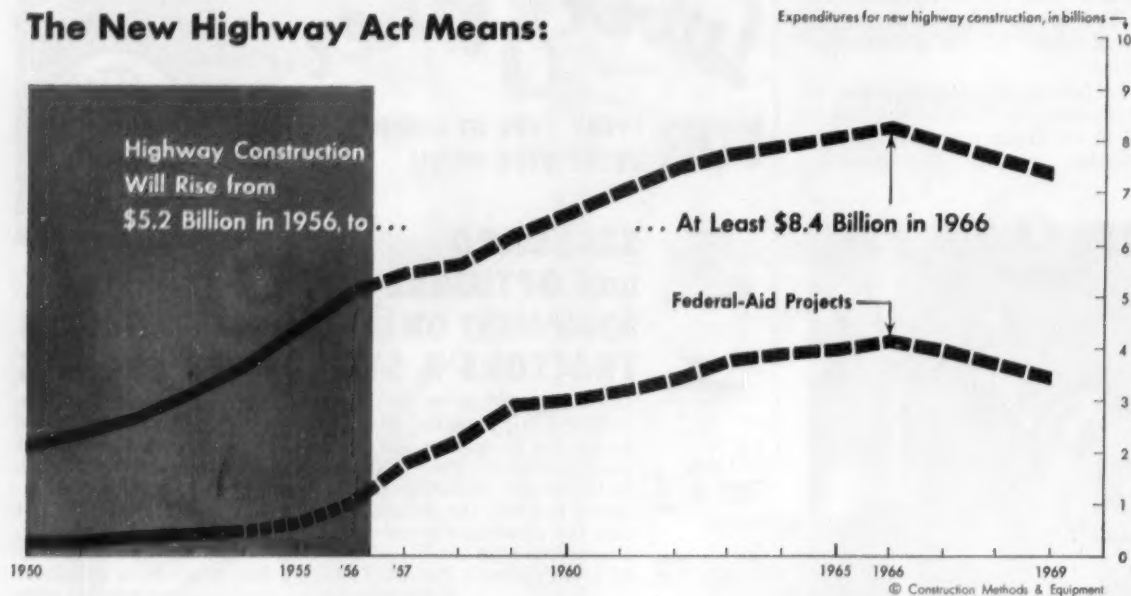
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It's Your Business . . .

The New Highway Act Means:



Fast Break on New Highway Program

WITHIN A MONTH contractors should start moving dirt for the new \$33-billion highway construction program. Nearly \$28 billion of this total will go for the 41,000-mile interstate system for which the federal government will put up \$25 billion over 13 years starting July 1 this year. The other \$5 billion (\$2.55 billion of federal funds) is for the first three years construction on primary and urban highways. About 13% of the total will go for right-of-way acquisition; the rest for construction costs.

The chart above shows CM&E's estimates of how this new program will push total new highway construction upward to a peak of at least \$8.4 billion by 1966. During the early years, it's estimated that the stepped-up federal-aid program will mean year-to-year increases of about \$600 million. By 1959 this would put federal-aid highway spending at \$3 billion per year, nearly three times the 1956 rate of spending. By 1966, federal aid spending will peak out at about \$4.4 billion. Add to this some \$4 billion spending by states, counties, and municipalities for other than federal-aid projects and you have the prospect of \$8.4 billion in highway spending by 1966. Com-

pared with the current annual spending of about \$5.2 billion for all highways, this represents an increase of better than 60%.

Some Projects Ready Now

Because of the lead time required between the allocation of highway funds to the states (allocations for the first three years 1957-59 were announced as early as last June) and completion of design work, contract awards for the new program will start to pile up gradually. According to ARBA, an average time lag of 21 months is currently about average for federal-aid projects. Of course, state highway engineers have been working hard at devising means of speeding up design to cut down the lag time. Indications are that new or better methods developed so far can cut the lag period to an average of 15 months.

But many projects shouldn't take even 15 months because of advance planning by states. For over a year, the states have been alerted to the opportunity of the new highway program, and some have been making advance plans so they could move ahead rapidly once the program became law. Backlog of proposed highway construction

shows that the states already have in the planning stage some \$12 billion in highway projects plus nearly \$3 billion in bridge projects. Some of these projects will become part of the interstate system.

Preliminary and some final planning of expressways already is completed in several metropolitan areas. This type of work makes up a major portion of the interstate network program.

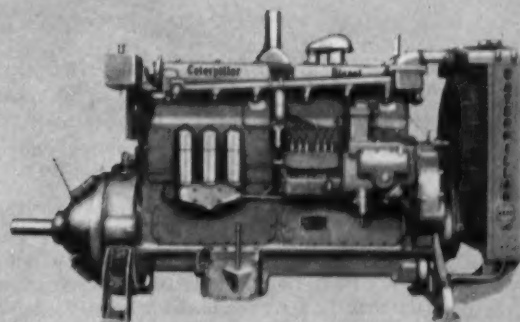
California is set to let some \$40 million. Ohio figures it is now ready to finance \$227 million in new highway work. Pennsylvania has several big projects ready to go. Michigan authorized contract lettings for 219 miles of road to cost \$146.3 million. New York State highway officials expect they will be able to assign within one year all of the federal funds allocated so far for the interstate, primary, and urban networks. New York will let contracts for the first nine of its projects covered by the new highway act during the current fiscal year.

Contractors Able

Though prospects are for new records in highway construction every year from now to 1966, contractors have enough capacity to



DEPENDABLE CATERPILLAR POWER HELPS CHANGE NIAGARA'S COURSE



Caterpillar-powered equipment is helping slow Niagara's famous Bridal Veil Falls to a temporary trickle. This CAT*-powered Koehring crane is swinging two men with sandbags to build a diversion dam in the Niagara River. Walter S. Johnson Building Co., Inc., of Niagara Falls, N. Y., is building a total of three dams. The objective is to direct the river flow away from two islands, which are badly water-eroded, so that overhanging precipices can be cut away.

"We've been in business 33 years," says Jack B. Johnson, vice president, "and when we discovered Cat quality, we stayed Caterpillar owners. They're dependable, durable machines." The Johnson company is 100% Caterpillar equipped. They have a D315 in another Koehring plus four Caterpillar track-type Tractors, in addition to the D13000 in this rig.

The D13000's reputation as a tough, long-wearing engine is now being carried on by its new modern version, the D342, which develops even more horsepower from the same size engine. The D342 is only one of the new models in the Caterpillar line of modern Diesel Engines, now available with maximum output capacities up to 650 HP.

All these new power plants share the advantages of Caterpillar's sturdy four-cycle construction. There's no need to clean air boxes or cylinder ports, or to tinker with fuel injection adjustments. These dependable yellow engines have such long-life features as "Hi-Electro" hardened crankshafts, special aluminum alloy bearings, and highly effective oil, air and fuel filters.

Your Caterpillar Dealer will tell you about the Caterpillar Engine that can do most work at lowest cost for longest time on *your* job. See him when it's time to repower—and specify Caterpillar power when you order new excavating equipment from a leading manufacturer.

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

CATERPILLAR*

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**MODERN
HEAVY-DUTY POWER**

**FOR
PERMANENTLY
STRONG, TIGHT
JOINTS IN
STRUCTURAL
STEEL FRAMING**

Specify
MIL-CARB*
carburized
WASHERS

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Bearing in mind the fact that "no bolt is any better than its washers" ... it is of vital importance to the consulting engineer, architect, contractor and the ultimate owner ... that all high strength bolted steel construction should not be jeopardized through the use of inferior washers.

To eliminate the possibility of "galling" or grinding of the washer surface in the process of torquing up the nut ... it is of great importance that the washer is, first of all, made of prime carburizing special soundness steel. And second, it is of equal importance that the actual carburizing or hardening process will produce washers insuring uniform quality control, always equal to or exceeding the rigid specifications set up for high strength bolted steel construction (ASTM Designations: A325, applying to nuts, bolts and washers).

MIL-CARB* Carburized Washers overcome inherent weaknesses often present in heat-treated washers fabricated from steel of questionable quality. These *better washers* are your best assurance of permanently strong, tight joints that become integral parts of the steel structure ... *as permanent as the steel itself!*

For your own protection and for uniformly sound construction, specify MIL-CARB* Carburized Washers and accept no substitutes.

Since 1887



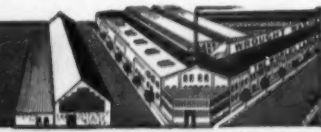
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The World's Largest Producer of Washers

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IT'S YOUR BUSINESS ...

continued from page 24

handle the boom in new business. In fact, contractors already have more than enough highway construction capacity to see them through the first five years or so of the new program.

According to an ARBA survey, highway contractors now can handle \$8.8 million in new highway work per year. This is well in excess of the \$5.2 billion of highway construction estimated to be put in place this year. By next year, contractors figure they can take on a whopping \$10.8 billion, and by 1959 they could handle nearly \$12 billion.

The chief bottleneck to a rapid acceleration of the new highway program is right-of-way acquisition. So far, 12 states have set up some system to help their highway departments with this problem. Some states have revolving funds. But many more states will have to develop some means of getting the land needed far enough in advance to avoid long delays in their highway construction programs.

Furthermore the capacity situation is not bright for some materials and supplies. Steel and cement are already headaches. In fact, the steel strike aggravated a critical shortage of structurals which has plagued construction for two years. Though some additions to structural rolling capacity now are being pushed, the extension of delivery times on new orders—which were taking 12 months or more in many instances before the strike—means the steel supply problem will remain acute through most of 1957. Cement expansion is going ahead in a measure which should sustain the new highway program without delaying construction schedules.

A lot depends, of course, on what happens to demand from other types of construction, particularly for steel and cement. The current industrial expansion boom is bringing heavy pressure on steel capacity. Nearly all types of heavy construction are going at record paces this year, and the outlook is for continuing high levels. So it's not hard to see that materials availability will be a major consideration in programming the construction schedule of the new highway program.

(Continued on page 28)

GULF PRODUCTS and FINE SERVICE

keep equipment rolling
on New York State Highway Project



Bero Construction Corporation is mighty careful about controllable costs, particularly the kind attributable to excessive wear, below par equipment performance, and mechanical delays. And that is one important reason why this prominent contractor selects Gulf as a supplier of petroleum products on their many jobs, like the one pictured here.

The Bero people have found that Gulf quality lubricants and fuels contribute to top equipment performance and low maintenance expense . . . and they appreciate Gulf's prompt delivery service and helpful engineering counsel.

Let us discuss with you how Gulf can help you on *your* next job. Or, send the coupon for your copy of our new brochure, "Gulf and *Your* Business."

Bero Construction Corporation, Buffalo, N. Y., is constructing for the New York State Highway Department a 4-lane bypass for U. S. Route 20 at Canandaigua, New York. 75% of the 2.25 miles of new highway is being laid over swamp land, and approximately 303,000 cubic yards of excavation are required.

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GULF OIL CORPORATION • GULF REFINING COMPANY



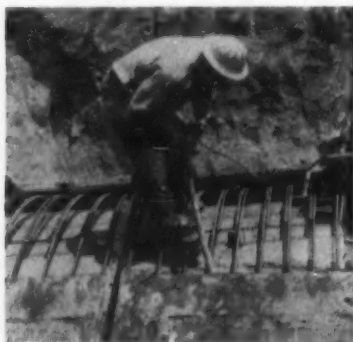
THE COMPACTNESS and lightweight portability of UniViber makes it easy for one man to handle . . . small size makes it easy to transport in trunk of ordinary car.

Extra Man Eliminated by Using UniViber Plug-in Vibrator

Motor in head design eliminates the hours wasted by workman dragging motor after the operator and provides greater flexibility in job application.

Motor in Head

UniViber power is a universal type motor connected directly to the eccentric weight it rotates. It may be plugged into any standard 115 volt AC or DC source. The motor is cooled by wet concrete surrounding the head. Speed approaches 10,000 rpm. More work can be done in less time, and with minimum danger of damage to forms by using the high speed low amplitude type of vibrator pioneered by VIBER.



Particularly adaptable for use in hard-to-reach places, UniViber may be tossed into the concrete and pulled back toward you . . . the UniViber vibrator manipulates effectively and easily by using the casing as a handle.

Greater Flexibility in Operating Techniques Reduces Costs

Wires leading to the head are protected by a flexible casing which also functions as a convenient handle. The easy-to-handle UniViber vibrator gives the workman more freedom of action because absence of moving parts in the casing allows increased flexibility. This new freedom enables the operator to employ new cost saving vibrating techniques.

Two Models Available

UniViber Model 1M3R is equipped with the Viber patented replaceable rubber tip. Model 1M3 has housing with steel nose. One piece VIBER patented eccentric weight is tapered to produce minimum vibration where brushes ride on the commutator. Another feature is splash lubricated non-metallic separator bearings, used so successfully in other VIBER vibrators.

VIBER COMPANY is a pioneer in the design and development of both internal and external vibrators. For further information on VIBER'S complete line of vibrators, contact your authorized distributor or Viber Company, Dept. 81DK 726 So. Flower Street, Burbank, California.



VIBRATORS SINCE 1931

IT'S YOUR BUSINESS . . .

continued from page 26

Construction machinery and equipment manufacturers have been expanding their manufacturing facilities. By next year they expect to be able to supply new equipment needed for an \$8.5-billion level of highway construction. By 1959, they figure to have the capacity to take care of an \$11-billion-annual highway construction program.

Highway Construction

CM&E Estimates of Value of Work Put in Place 1957-69, in Billions of Dollars

	Total Construction	Federal Aid
1950	2.3	0.4
51	2.5	0.4
52	2.8	0.5
53	3.2	0.51
54	3.8	0.59
55	4.5	0.65
56	5.2	1.20
57	5.6	1.8
58	5.8	2.4
59	6.4	3.0
60	6.8	3.2
61	7.2	3.4
62	7.6	3.6
63	7.8	3.8
64	8.0	4.0
65	8.2	4.2
66	8.4	4.4
67	8.1	4.1
68	7.8	3.8
69	7.5	3.6

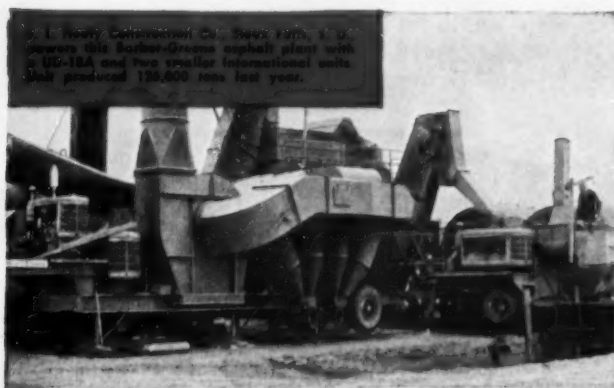
SOME BIG CONTRACT AWARDS OF THE MONTH

Stone & Webster Engr. Corp., 1403 Roseneath Rd., Richmond, Va. Design and construct 150,000-kw generating unit and structural unit to house generating facilities in Portsmouth, Va. for Virginia Electric & Power Co., 7 and Franklin Sts., Portsmouth, Va. \$22,000,000.

Koppers Co. Inc., Koppers Bldg., Pittsburgh 19, Pa. Design and construct, rebuilding coke oven battery with auxiliary equipment in Cleveland, Ohio for Republic Steel Corp., Republic Bldg., Cleveland 15, Ohio. \$20,000,000.

Foster Wheeler Corp., 165 Broadway, New York 6, N.Y. Design and construct 300 ton per day ammonia

(Continued on page 200)



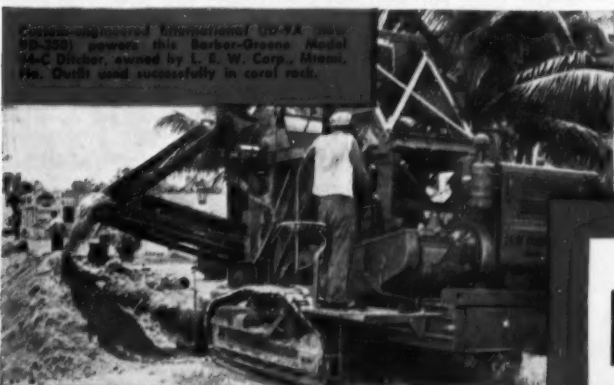
L. Henry Construction Co., New York, N. Y., owners of Barber-Greene bucket loader, UD-18A and two smaller International units. Unit produced 125,000 tons last year.



Barber-Greene Model 82A Bucket Loader, owned by E. J. Construction Co., Chicago, Ill., is powered by UD-1A (now UD-350). Capacity from 30 to 120 tons per hour.



Kurtz Trussell Co., Independence, Ohio, uses an International UD-9 (now UD-350) for Barber-Greene 582 Bucket Loader. Works continuously with wheel conveyor.



Custom-engineered International UD-9A (now UD-350) powers this Barber-Greene Model 54-C Ditcher, owned by L. E. W. Corp., Miami, Fla. Ditcher used successfully in coral rock.

4 more Barber-Greene owners choose International Power Units

...custom-engineered to fit
contractors' power needs

More and more Barber-Greene owners are choosing International power units because of these advantages: (1) wide choice of combinations and sizes for many construction equipment applications; (2) adaptation of performance characteristics to match special applications; and (3) built-in long life, dependability, and low-cost operation from 55 years' engine-building experience.

When you specify International power units for new or existing equipment, you get these specific design features as well. In an International diesel for example, you get fast, any-weather, low-compression, gasoline conversion starting; non-fouling, tinker-free, clean-burning fuel injection and combustion; and new gear-driven balancers in the 4-cylinder UD-14A and UD-350 diesel engines for "6-cylinder" smoothness and performance.

In addition, International diesel engines give you rifle-drilled passageways for "special delivery" of oil to every friction point; full-pressure lubrication with full-flow filtration; full-length water jackets for uniform, hot-spot-free cooling, and many other International features which add up to dependable, low-cost operation and long life.

See your International Power Unit Distributor or Dealer now if you're planning a new equipment purchase or if you're repowering your present equipment. His complete power analysis, help in selection, and installation service will save you time and money...assure you of profitable International diesel or carbureted power for a long time to come.



**INTERNATIONAL
CONSTRUCTION
EQUIPMENT**

International Harvester Company

A COMPLETE POWER PACKAGE INCLUDING: Crawler, Wheel, and Pipe-Boom Tractors... Self-Propelled Scrapers and Bottom-Dumps... Tractors and Rubber-Tired Loaders... Off-Highway Trucks... Diesel and Carbureted Engines... Motor Trucks.

**CHOOSE FROM 17 HEAVY-DUTY
INTERNATIONAL DIESEL AND CARBU-
RETED ENGINES—FROM 17 TO 214 HP**

**See you at the
ROAD SHOW
CHICAGO
Jan. 28—Feb 2, 1957**



"New Bonus-Powered International® *give work-speeding capacity...new*

To grade the Indian Hills home project site near Sioux City Country Club, Contractor William C. Grady, LeMars, Iowa, must move 132,000 yards of dry clay—must make cuts 35 feet deep, and fills 25 to 40 feet deep. Two new International 55 Payscrapers, push-loaded by TD-18 crawler, replaced two crawler-

scraper units, with these big results:

"The two new 55 Payscrapers have jumped our daily yardage 1500 yards—80% or better—compared to crawler-scraper units replaced," reports Owner Grady. "The new 55's have proved that even on very short hauls, their rubber-tired speed pays off. Now, our same

"Years of excellent performance from our International crawler fleet, backed by fine service, helped our company grow to a fleet of 11 International crawlers," states Nor-Vel Construction Co., Ferguson, Mo. Here's two of their TD-24's, helping move wet clay on a large Black Jack, Mo., housing job.

"The new TD-9 has got it—more reserve power that speeds the job," states Owner Gene Elkins, Pontiac, Mich., of his new bonus-powered International crawler—shown doing "clean-up" and grading on a 306-home project near Detroit. "It's really got zip—dozes dirt extra fast in second gear."





**"Short-haul
yardage soars"**

outfits *operating ease"*

manpower moves practically double our former yardage. Loading averages 42 seconds in dry, hard-packed clay. Easy operation and plenty of power make new Payscrapers the operators' favorites."

Why not try a bonus-powered International outfit on your job? See your nearby distributor for a demonstration!

**See you at the ROAD SHOW—
CHICAGO Jan. 27 to Feb. 4, 1957**

"I can rip up concrete with pry-action break-out—without strain on the crawler," declares J. E. Johnson, Knoxville, Tenn., of his new bonus-powered TD-9 International Drott Skid-Shovel. **"Best grading loader I've operated. Has no-strain steering, fine job vision!"**

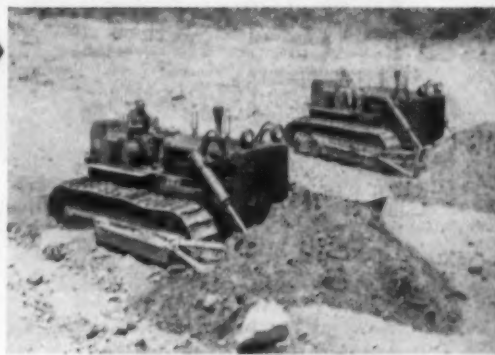
4 new TD-24's. "Work ability and distributor service were major factors when buying 4 new TD-24's," says Tony Petitto, Jr., Byron Construction Co., Clarksburg, W. Va. These tractors replaced 4 competitive crawlers. A fifth TD-24 on this stripping job has worked 7500 hours.

"95% International since 1940—"

"Loose, dead sand—almost impossible to load—yet we average 2500 yards daily where I believe other scrapers would fail miserably," reports Contractor N. V. Lamb, Lusk, Wyo. **"The powerful International TD-24 Torque Converter and easy-loading 55 Payscrapers are giving high output in tough material!"**

"Since 1948, preferred International engines"

"With only routine care our International machines stand up," state Howard and Dorsey Hall, Hall Sand & Gravel, Denver, Colo. Their new TD-14 (142 Series) is shown stockpiling sand. Their International fleet includes a TD-14 Skid-Shovel, four power units!



INTERNATIONAL[®] Construction Equipment

International Harvester Company, 180 N. Michigan Avenue, Chicago 1, Illinois

**A COMPLETE POWER PACKAGE INCLUDING: Crawler, Wheel, and Pipe-Beam Tractors . . . Self-Propelled Scrapers and Bore-
Dumps . . . Crawler and Rubber-Tired Loaders . . . Off-Highway Trucks . . . Diesel and Carbureted Engines . . . Motor Trucks**

"We do '4-hr. jobs' in 2 hrs. with our new TD-9 Skid-Shovel"

—Beatrice Concrete Co.
Beatrice, Nebraska



"Snappiest loader on the market"

Hoosier Lime and Stone Co., Salem, Indiana, added a bonus-powered International Drott TD-9 Skid-Shovel to load crushed stone, level overburden, do custom excavating. "This is the snappiest tractor shovel on today's market," states Operator Lawrence Rutherford. "The new TD-9 Skid-Shovel lifts faster, has more engine power, plenty of operator room and comfort, operates easier, has much better vision."



"Plenty of power . . . perfect vision"

This new TD-9 Skid-Shovel loads 12 to 15 tons of zinc ore from stockpile, every 3 or 4 minutes. Turley and Yates, Rutledge, Tenn., also dig basements, clear and drain land, do custom loading with it. Says Partner Joe E. Yates: "It's fast, easy to operate, has plenty of power, and perfect loading-cycle vision. Hydro-Spring is a life-saver to unit and operator. Roomy seat and handy controls increase output, reduce tiring."

"First thing we noticed about this new International Drott was that it does former '4-hour jobs' in 2 hours," reports Supt. Eldon Chamberlain. "Watching it showed why it doubles production. This new rig fills a bucket easier and faster with pry-action break-out. Operator has better control, watches bucket action more easily—and added hp does top speed work with no strain on machine or operator."

This ready-mix concrete company also excavates and grades—digs basements, backfills, and loads spoil dirt. They recently replaced their older crawler-loader with a new International Drott TD-9 Skid-Shovel.

See how exclusive pry-over-shoe break-out action—now increased to 10,000 lbs. in the International Drott TD-9 Skid-Shovel—gets you the "too-tough-for-others" jobs; helps out-produce 'em anywhere. Prove exclusive, shock-swallowing Hydro-Spring as a cost-cutting yardage-booster. Or, try an exclusive Four-In-One Skid-Shovel—4-machine utility, one moderate investment. Ask for a demonstration!

See you at the ROAD SHOW
CHICAGO
Jan. 28-Feb. 2, 1957

International Harvester Company, Chicago 1, Illinois
Drott Manufacturing Corp., Milwaukee 8, Wis.



INTERNATIONAL®

DROTT®


Save time and money
on low-cost drainage jobs...

AMBRIDGE Sectional PLATE

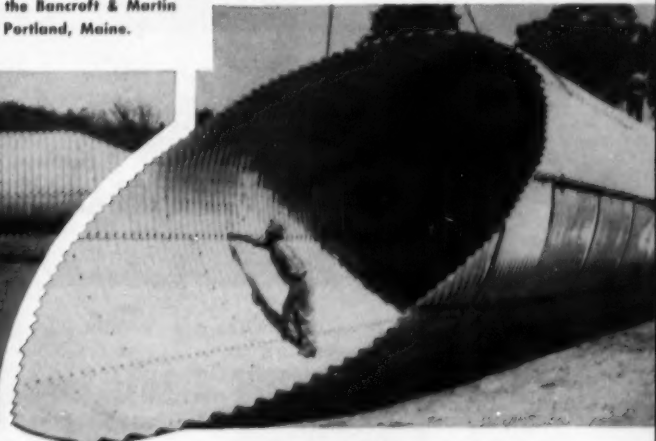
AMBRIDGE Sectional Plate for pipes, arches and pipe-arches meets the specifications of the American Association of State Highway Officials, and can be adapted to all state, railroad and government specifications.

Fabricated in 2" deep corrugations on 6" centers with standard punchings . . . and galvanized after fabrication, AMBRIDGE Sectional Plate is furnished to accommodate any shape or size of pipe, arch, or pipe-arch, complete with bolts. Special details, such as asphalt coating, hook bolts, beveled ends, and skewed ends, are furnished as specified for each job.

For further information, we suggest that you contact the office nearest you. Or, an inquiry direct to our Pittsburgh headquarters will bring detailed information.



The Harris Brook Bridge, near New Portland, Maine, is a 156"-diameter, 86'-long pipe culvert made from AMBRIDGE Sectional Plate by the Bancroft & Martin Rolling Mills Company, South Portland, Maine.

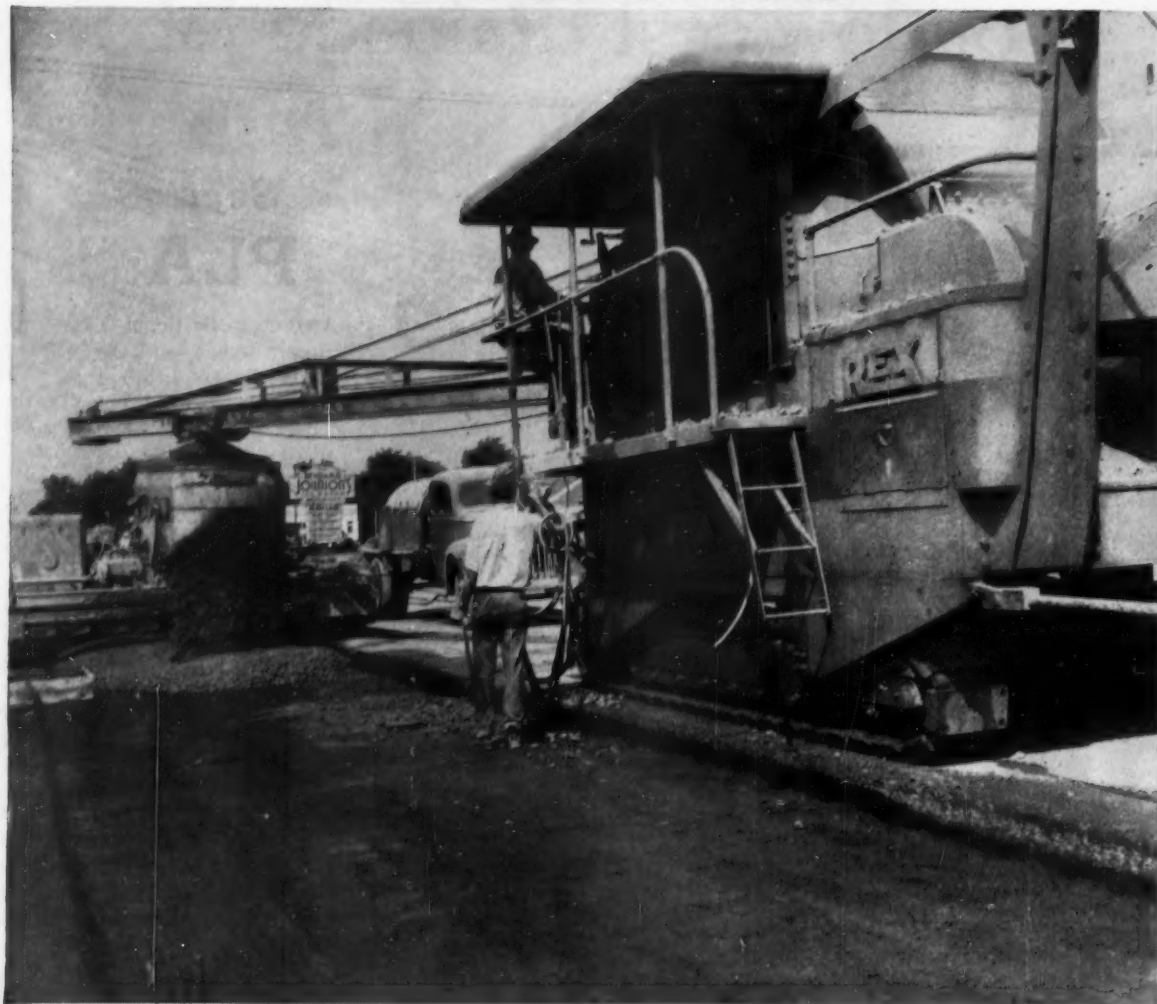


AMERICAN BRIDGE DIVISION, UNITED STATES STEEL CORPORATION • GENERAL OFFICES: 525 WILLIAM PENN PLACE, PITTSBURGH, PA.
Contracting Offices in: AMBRIDGE • ATLANTA • BALTIMORE • BIRMINGHAM • BOSTON • CHICAGO • CINCINNATI • CLEVELAND • DALLAS • DENVER • DETROIT • ELMIRA • GARY
HOUSTON • LOS ANGELES • MEMPHIS • MINNEAPOLIS • NEW YORK • ORANGE, TEXAS • PHILADELPHIA • PITTSBURGH • PORTLAND, ORE. • ROANOKE • ST. LOUIS • SAN FRANCISCO • TRENTON
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

AMBRIDGE *Sectional* PLATE

UNITED STATES STEEL

B.F. Goodrich



Now pavers with rubber shoes keep road from cracking

How B.F. Goodrich crawler pads speed paving operations

YOU contractors know what a problem it is, operating steel-tracked equipment on highways. In most states, you have to protect the finished road surface by laying planks or belting under the crawlers.

Contractors have often discussed the problem. One of them remembered some of the unusual things B.F. Goodrich engineers do with rubber. Could the steel tracks be padded with rubber? Rubber would protect the road, but would it last long enough? Could rubber stand the heavy weight

without tearing loose from the steel?

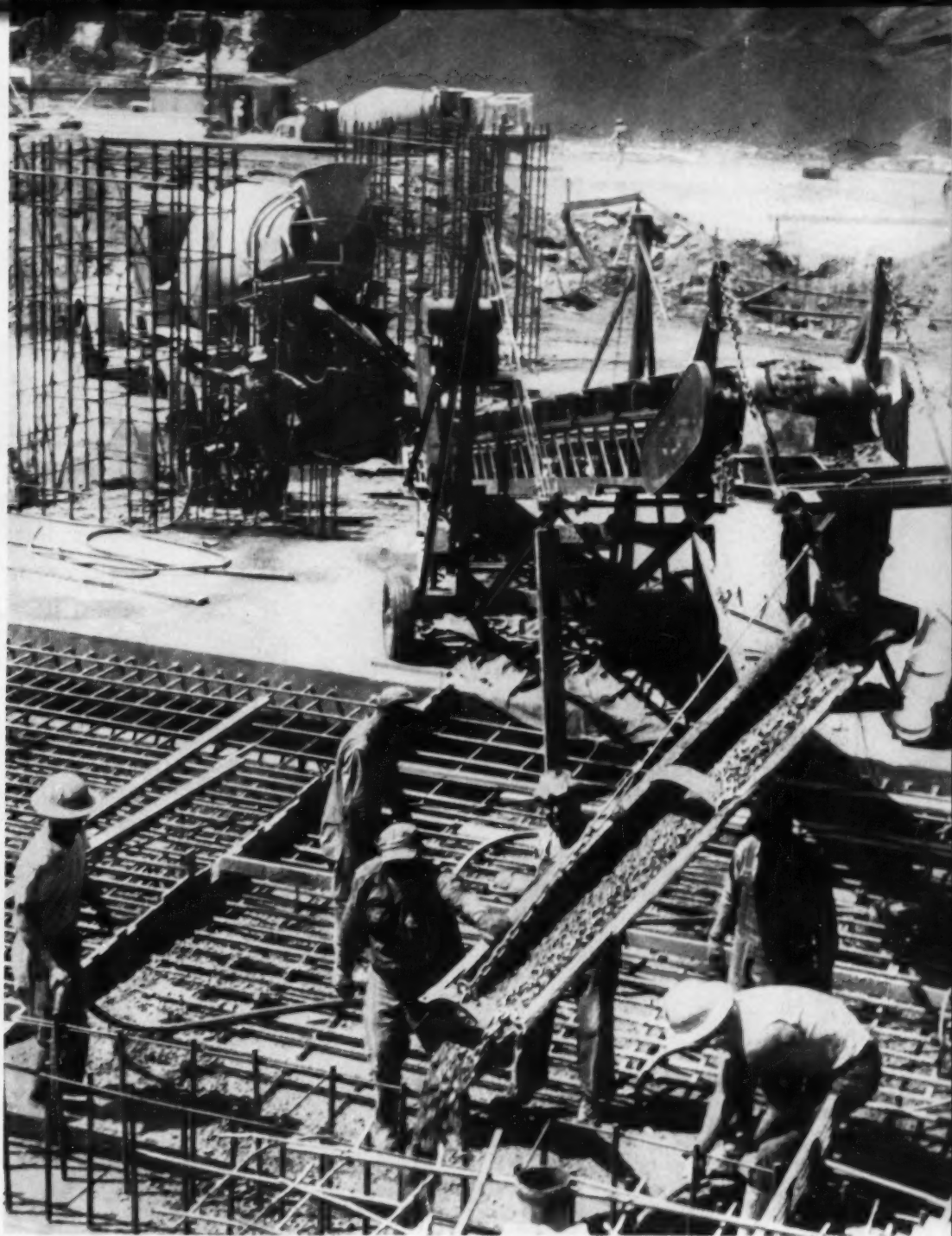
B. F. Goodrich men had a good start on the problem because they had already developed the toughest wear-resisting rubber known. By bonding it to steel plates, they came up with protective crawler pads that can be bolted to the individual cleats.

The B. F. Goodrich "rubber shoes" let pavers, like the one in the picture, travel over concrete without damage to the surface. Usually, 80 pads are needed for each paver, but the cost is surprisingly low. Some users tell us that the

crawler pads pay for themselves the first month in just the savings in labor.

Your B. F. Goodrich distributor can give you full details about the size, thickness of rubber, ease of installation, and the cost. Or write B. F. Goodrich Industrial Products Co., Dept. M-731, Akron 18, Ohio.





Fast and Efficient

• A portable, self-powered conveyor system speeds the pour of a 4-ft slab for Utah Power & Light Co.'s new plant near Castle Gate, Utah. Bechtel Corp. brought in the 50-ft Atlas portable conveyor to supplement pouring directly from trucks for 70x30-ft slabs. A gasoline engine powers the conveyor belt, and the two-wheeled unit moves easily into areas inaccessible to trucks. Bechtel is pouring a daily average of 221 yd. Total pour will be 2,106 yd.

**PICTURE
OF THE
MONTH**



Proving that

P&H

has

Today P&H is recognized as the leader in the excavator industry.

Why?

Because P&H, and P&H alone, has taken excavators out of the steam shovel era and applied automotive-type construction, automotive-type power trains and automotive-type controls to power cranes and shovels.

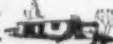
The result?

Power crane and shovel performance that delivers the highest net operating profit.

No matter what your shovel or crane needs are, be sure to get the full, profitable benefits of P&H unit rolled construction, *fabricated by arc welding*. This feature alone eliminates troublesome assembly by multiple mechanical joints, bolts, rivets and tie rods!

Get the full P&H story—proof that P&H has the “guts” to do any job; proof that is borne out every day on the Harnischfeger Proving Grounds where every shovel and crane is thoroughly tested. Harnischfeger Corporation, Milwaukee 46, Wisconsin.

the **P&H** *Line*



TRUCK CRANES DIESEL ENGINES POWER SHOVELS PREFABRICATED HOMES HOISTS SOIL STABILIZERS WELDING EQUIPMENT CRAWLER CRANES



the GUTS to do the job!

The unretouched photograph above shows P&H equipment being tested at the
Escanaba, Michigan, Harnischfeger Proving Grounds

For Modern Engineering, Look to

HARNISCHFEGER

Power Crane & Shovel Division

(Advertisement)



"SMOOTH AS STEAM" WITH S-5 HAMMER: 12" tubing is being driven to approx. 47' for pier bearing piles for an approach to Cincinnati's Third Street Distributor. The "powerhouse" of this operation is the Jaeger "600"

rotary, at right of the driving rig. The single acting Model S-5 McKiernan-Terry hammer, with a bore of 14" and a $3\frac{1}{4}$ " stroke, hits 60 blows per minute of 16,250 foot pounds when operated with Jaeger "Air-Plus" pressure.

Sixty 16,250 lb. wallops with 600 cfm of Jaeger air

To put 16,250 pounds of pile driving wallop into a McKiernan-Terry S-5 hammer, 60 times a minute, you need a 40 hp boiler or a Jaeger "600" rotary compressor.

The Jaeger rotary does the job efficiently and a lot more conveniently. It puts out 600 cfm of 100 lb. air with its 6-71 GM Diesel engine operating at only 1650 rpm. (Other "600" rotaries need 1750 to 1800 rpm.) Moreover, control of engine and compressor are so closely regulated to air demands that pressure is held constant even under the extreme fluctuations of pile driving. Engine speed modulation is smooth and stepless over the entire operating range.

You enjoy the same operating advantages on other types of air work and also in smaller Jaeger rotary compressors. It will pay you to get full details or demonstration from your Jaeger distributor—or let us send you Catalog JCR-5.



HOW TO OPEN TRENCH, FAST: Three miles of conduit trench, in a Tacoma, Wash. street, was a fast-moving job with two #25 Thor breakers powered at top efficiency by a Jaeger "125" rotary. Compressor holds 8 hrs. fuel supply and a full set of tools; weighs hundreds of pounds less than old types; is easily rolled along on retractable pneumatic tired dolly wheel.



THE JAEGER MACHINE COMPANY

800 Dublin Avenue, Columbus 16, Ohio

PUMPS • CONCRETE MIXERS • SPREADERS • FINISHERS • TRUCK MIXERS

Construction News in Pictures . . .



First Concrete

Tri-Dam Constructors pour the first concrete for Donnell's Dam in California. Concrete for the 200,000-cu yd arch structure is batched in a Johnson plant and handled by a Lidgerwood cableway. Tri-Dam Constructors is a joint venture of Morrison-Knudsen, Macco, Kiewit, Stolte.

In Tight Quarters

For compaction in areas where it's difficult to operate rollers, Gene Richards, Inc., Fresno, Calif., mounts an Ottawa Steel tamper on an International Drott TD-6 Skid-Shovel. Rig is at work by an overpass structure on the Fresno Freeway.

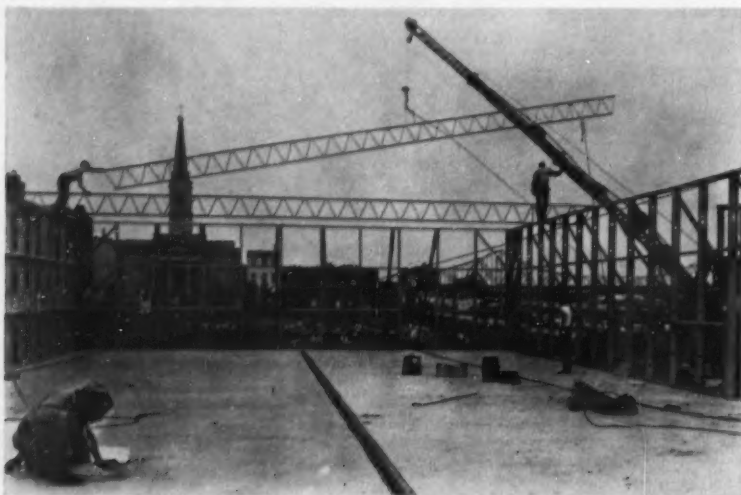
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Pipe Piling Supports Bridge

Oklahoma Turnpike bridge over Cat Creek near Claremore rests on pipe piling foundations. Boecking Construction Co. drives two rows of piles supplied by L. B. Foster Co. Front row is battered 3 to 12, back row is vertical. Driving points are welded to piles in the field.





Long Joists

Buildings for the Mid-America Jubilee, to be held next month in St. Louis, Mo., are prefabricated, all-bolted structures, easily dismantled for storage and re-use. Steel joists 56 ft long, fabricated by Laclede Steel Co., make possible wide roof spans and cantilever overhangs.

Eight Stories High

Workmen insert a crown pin in laminated wood arches (still in paper wrappings) 294 ft long and with a clear span of 242½ ft. Twelve arches provide 50,000 sq ft of floor space for a Jai Alai arena at Riviera Beach, Fla. It will be the widest area ever covered with this type construction.



Cheap Job Warehouse

Arundel Corp. and L. E. Dixon Co., holders of a \$8.3 million contract to build Tulloch Dam in California, erected a warehouse on a 3-in. asphaltic concrete slab placed directly on smoothed subgrade. The 120x40-ft building is framed of wood studs and covered by board-and-batten siding.

faster

Royal Blue
has won acceptance *faster*
than any other wire rope
in Roebling history.



John A. Roebling's Sons Corporation, Trenton 2, N. J., Subsidiary of The Colorado Fuel and Iron Corporation BRANCHES: ATLANTA, 934 AVON AVE. • BOSTON, 51 SLEEPER ST. • CHICAGO, 5635 W. ROOSEVELT RD. • CINCINNATI, 2340 GLENDALE-MILFORD RD., EVENDALE • CLEVELAND, 13325 LAKEWOOD HEIGHTS BLVD. • DENVER, 4801 JACKSON ST. • DETROIT, 915 FISHER BLDG. • HOUSTON, 6816 NAVIGATION BLVD. • LOS ANGELES, 6340 E. HARBOR ST. • NEW YORK, 19 RECTOR ST. • ODESSA, TEXAS, 1920 E. 2ND ST. • PHILADELPHIA, 330 VINE ST. • PITTSBURGH, 1723 HENRY W. OLIVER BLDG. • SAN FRANCISCO, 1740 17TH ST. • SEATTLE, 900 1ST AVE. S. • TULSA, 331 N. CHEYENNE ST. • EXPORT SALES OFFICE, 19 RECTOR ST., NEW YORK 6.



Here is the TRAILMOBILE



ALUMINUM cement bulker

a strong, streamlined, service-proved design

The newest thing about the Trailmobile aluminum cement bulker is the aluminum itself—for we have constructed in aluminum the same strength and ruggedness, the same safety and ease of operation that have made Trailmobile's steel bulkers high-profit performers for years.

In the aluminum bulker a weight saving of approximately 3,000 lbs.* gives you as much as 7% more payload capacity—enough added revenue in many operations to repay the cost of the trailer itself in a matter of months. We've also streamlined the unit by providing a smooth skin side without ribbing of any kind. And we've proved the over-all design under actual operating conditions during the past two years.

The Trailmobile aluminum bulker is a part of a complete line of bulk commodity trailers that meet every need. Call or write your nearest Trailmobile branch office for complete information.

**on 130-barrel unit*

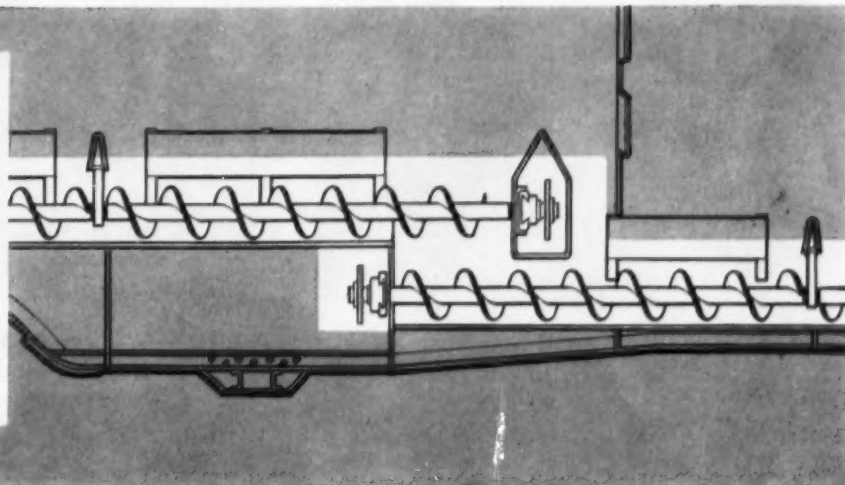
TR-476

TRAILMOBILE INC.

Cincinnati 9, Ohio • Springfield, Missouri • Longview, Texas • Berkeley 10, California

Trailmobile's exclusive step-down construction

Provides two single screws which operate independent of each other using $\frac{1}{2}$ as much horsepower as required by full length screw designs. This allows faster, positive unloading, and reduces maintenance due to shorter screw length and a smaller power unit.



Construction 'Round the World ...



In Peru

Cat D9 goes ashore in amphibious landing at Ilo, Peru, where construction men are pioneering development of one of the biggest known copper deposits in the world. Foley Hermanos, Ltd. is building port facilities at the site.



In Japan

There is a lot of heavy equipment on the job, but hand labor still plays a part in construction of Kanmon Tunnel between the Japanese islands of Honshu and Kyushu. The 2.1-mi tunnel will cost \$22 million.



In Australia

Cherry-picker passes muck cars in hydroelectric tunnel 5,500 ft long and 21 ft in dia in Tasmania, an island off Australia's southeastern coast. Utah of Australia, Ltd., is contractor on the \$6.5 million job.

DIGS A NEW LAKE IN 30 DAYS!

That's the record of this Bucyrus-Erie 1½-yd. dragline for Colorado contractor

Said Pioneer's operator of this dragline: "I have run many and like the 38-B best."



On a new highway near Monte Vista, Colo., the Pioneer Construction Co., Pueblo, Colo., excavated and loaded 45,000 cu. yd. of alluvial gravel in 30 days with a Bucyrus-Erie 38-B dragline. The excavation site is now a lake well stocked with fish.

The Pioneer Construction Co. was formed in January, 1955. Its growth reflects the wide experience and sound policies of the key men. They believe it takes the best of modern equipment, efficiently operated and properly main-

tained, to stay in business in contracting. Their experience with two Bucyrus-Erie 38-B's, one rigged as a dragline and the other as a shovel, has proved out this policy. These machines offer good production ability, and they are operated and maintained in a manner to provide economical performance.

Let your Bucyrus-Erie distributor give you complete details on these modern excavators — ¾ to 4 cu. yd. — and show you how they can help bring top efficiency to your operations.

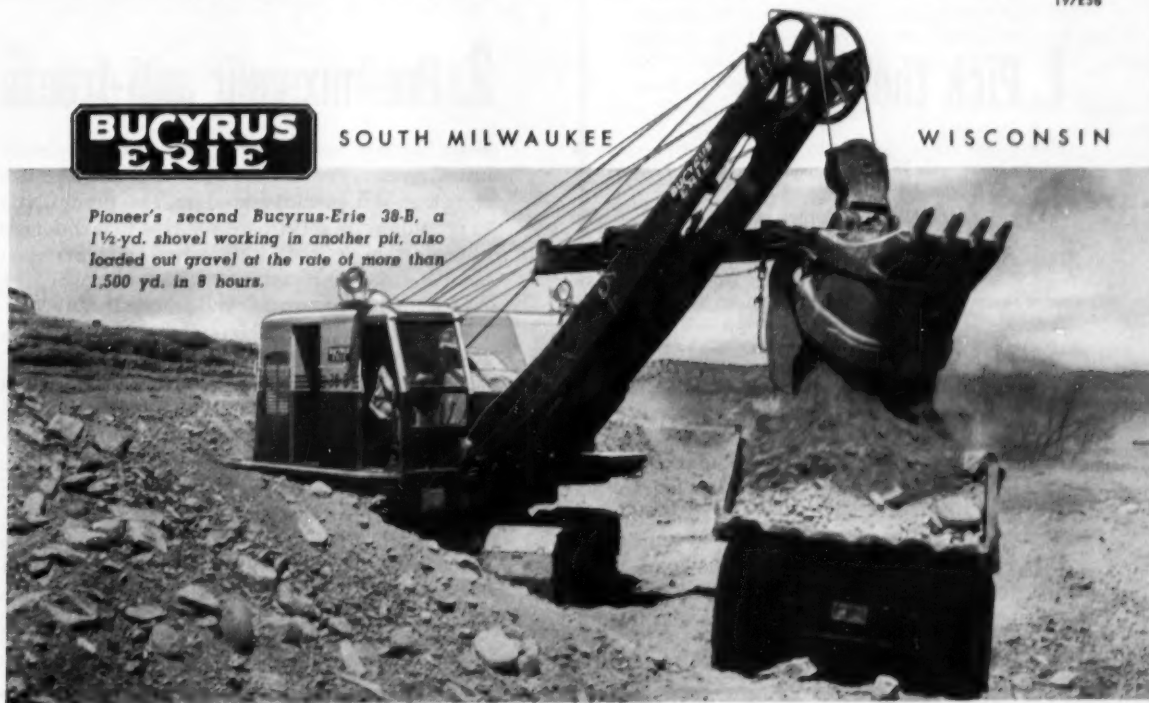
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**BUCYRUS
ERIE**

SOUTH MILWAUKEE

WISCONSIN

Pioneer's second Bucyrus-Erie 38-B, a 1½-yd. shovel working in another pit, also loaded out gravel at the rate of more than 1,500 yd. in 8 hours.



How the Du Pont Anti- save you work,



1. Pick the best!

Photograph above shows why your costly equipment is safest when you winterize with Du Pont Zerone® or Zerex® anti-freeze.

Flask "A" contains a solution of ordinary anti-freeze with an oil inhibitor. Flask "B" contains a solution of "Zerex" with Du Pont's exclusive chemical inhibitor. To each was added the same amount of ground rust. Flasks were shaken and contents poured. Notice how film of rust clings to the inside of Flask "A" just as it would to cooling system. But Flask "B" with "Zerex" is clean—rust particles stayed in suspension—drained out with the solution. Du Pont's chemical inhibitor will never form an oily film of rusty sludge that could clog radiators, causing overheating and serious engine damage.

This is just one of the many advantages you get when you protect your equipment from freeze-ups, rust and corrosion with either "Zerone" or "Zerex" anti-freeze. Pick the Du Pont anti-freeze best suited to your needs and you have taken the first step in the anti-freeze preventive maintenance plan—that will save you work, time and money.



2. Pre-mix your anti-freeze

Both "Zerone" and "Zerex" will mix completely in water, and the rust inhibitor will not separate from the solution while standing. This permits you to pre-mix your anti-freeze solution to any degree of protection desired for use when and where you need it.

Stock your pre-mixed anti-freeze in any convenient place. It will keep indefinitely—always ready to use.

When anti-freeze is pre-mixed, installations can be made rapidly by unskilled help and without the need for individual time-consuming hydrometer checks. What's more, guesswork and the chance of costly overprotection are avoided—and pilferage problems are discouraged.

Take advantage of the total savings possible when you pre-mix with Du Pont "Zerone" or "Zerex"—the quality anti-freezes that can be pre-mixed with water to stay!

Freeze **PM** Plan can PREVENTIVE MAINTENANCE time and money!



3. Use the "Zerex" Test Kit

Thousands of dollars' worth of equipment is ruined each year because winter-worn anti-freeze is left in the cooling system to turn acid and cause rust and corrosion.

Now for the first time Du Pont makes it possible for you to tell — right on the job — which "Zerex" anti-freeze solutions are safe to re-use and which are worn out and should be replaced with a fresh "Zerex" solution. In this way, you can reduce cooling system maintenance expense and cut your "Zerex" anti-freeze costs in half!

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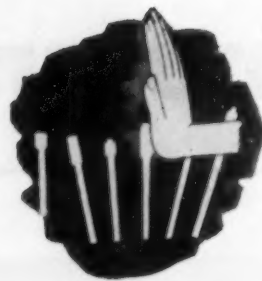
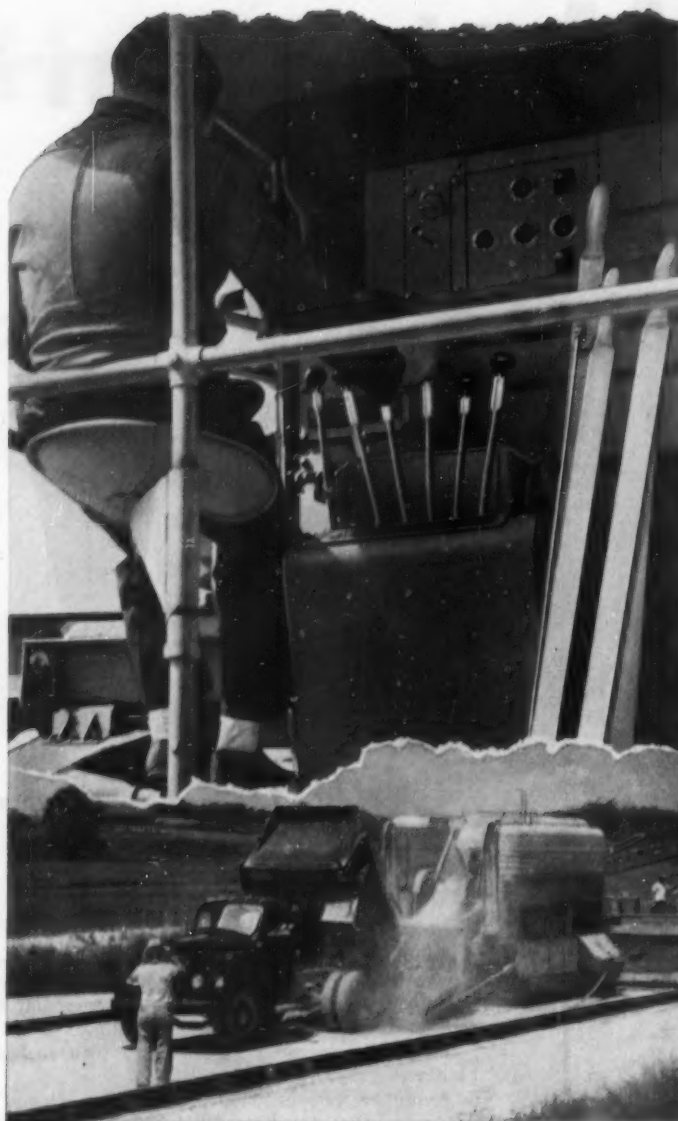
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CHAIN BELT COMPANY

Construction Methods AND EQUIPMENT

AUGUST, 1956

VOLUME 38 • NUMBER 8

HENRY T. PEREZ, Editor

Plan Now To Produce Your Own Aggregates

CONSTRUCTION eats up materials at a prodigious rate. Highway construction alone accounts for a mammoth share, as indicated by the figures below for the calendar year 1955.

But look at the Bureau of Public Roads' estimates for the next five years, when the expanded highway program will be building up steam in a hurry! Structural steel consumption for 1960 will be 109% of the 1955 figure, timber piling will be up 106%, and 93% more aggregates will be required. And there are many years' work beyond 1960.

Of special significance to the highway contractor is the aggregates item—it is the one material listed that the roadbuilder can produce himself. And to keep pace with the road program, increasingly greater numbers of contractors are going to be forced to make their own aggregates rather than depend on commercial sources of supply.

BPR breaks down its 1955 aggregates figure of 403-million tons into (a) 201-million tons purchased by contractors, and (b) 202-million tons produced by contractors. By 1960, BPR says, highway contractors' yearly purchases of aggregates will have risen only 62%, to 325-million tons. In contrast, roadbuilders by then will be producing 449-million tons of aggregates annually for their own account—a jump of 123% over last year.

This high figure will be reached by a gradual build-up, of course. Each year more contractors' existing plants must be modernized and expanded. Each year more contractors not presently in that phase of the business must begin turning out stone, gravel, and sand for their own use.

To help you set up a new plant, and to help you make your present plant more efficient, we begin on page 117 a new series of articles on "Producing Aggregates."

Manufacturing your own aggregates for your own jobs has many advantages. It can give you closer control over quality. It can assure your getting delivery at the right time. And it may give you a cost differential under a competitor who must buy his materials from an outside source.

Thoroughly investigate these factors. Unless you do, there is a distinct possibility of finding yourself faced with a serious shortage of aggregates at a price that will let you be low bidder at a profit.

Bill of Materials—Federal and State Highway Construction

Data: U. S. Department of Commerce, Bureau of Public Roads

	1955	1956	1957	1958	1959	1960	% of increase
AGGREGATES (millions of tons)	403.	544.	664.	722.	753.	774.	93
CEMENT (millions of barrels)	61.6	74.	94.5	102.9	107.4	110.5	79
BITUMINOUS MATERIALS (millions of tons)	5.85	7.15	8.73	9.49	9.90	10.18	74
ALL STEEL (millions of tons)	2.085	2.720	3.332	3.625	3.779	3.885	87
STRUCTURAL STEEL (millions of tons)	.983	1.442	1.760	1.914	1.996	2.052	109
REINFORCING STEEL (millions of tons)	.807	.931	1.136	1.236	1.288	1.325	64
CORRUGATED STEEL PIPE (millions of tons)	.148	.165	.201	.219	.228	.234	58
LUMBER (millions of board feet)	385.	403.	492.	535.	558.	573.	49
REINFORCED CONCRETE PIPE (millions of tons)	2.64	2.89	3.29	3.57	3.72	3.83	45
CLAY PIPE AND TILE (thousands of tons)	47.	55.	67.	73.	76.	78.	65
TIMBER PILING (millions of board feet)	82.	119.	146.	158.	165.	169.	106
GASOLINE, DIESEL FUEL AND LUBRICANTS (millions of gallons)	652.	744.	908.	987.	1,029.	1,059.	63
EXPLOSIVES (millions of pounds)	90.	102.	124.	135.	141.	144.	60



RAKER BRACES support embankments at \$35 million Court House Square Development in Denver, Colo. Rakers, which are up to 90

ft long, are prevented from buckling by two sets of intermediate piles driven to bedrock to serve as additional support.

Deep Foundation

BUILDING ANY FOUNDATION 50 feet deep is tough. But when 27 ft of groundwater has to be removed and walls must be poured through heavy networks of steel raker beams supporting the embankments, the job is both tough and tricky.

Webb and Knapp Inc. of New York City actually asked for these problems when it decided to build the \$35 million Court House Square Development in Denver, Colo. The firm is both builder and owner.

W&K wanted to get as much building as possible into the 617x400-ft parcel of land it owned in the downtown section of the city. Scheduled to go into the plot were a five-story department store, an 18-story hotel, and a 1,500-car parking lot. But the plot was large enough only for the hotel and store. The parking area had to go underground — four sub-basement levels underground.

To help solve the problem, W&K

called in New York consulting engineers Moran, Proctor, Mueser & Rutledge, who came through with a method for tackling the tricky job. Executing the plan, however, became the personal problem of Webb and Knapp's project manager T. J. Smith.

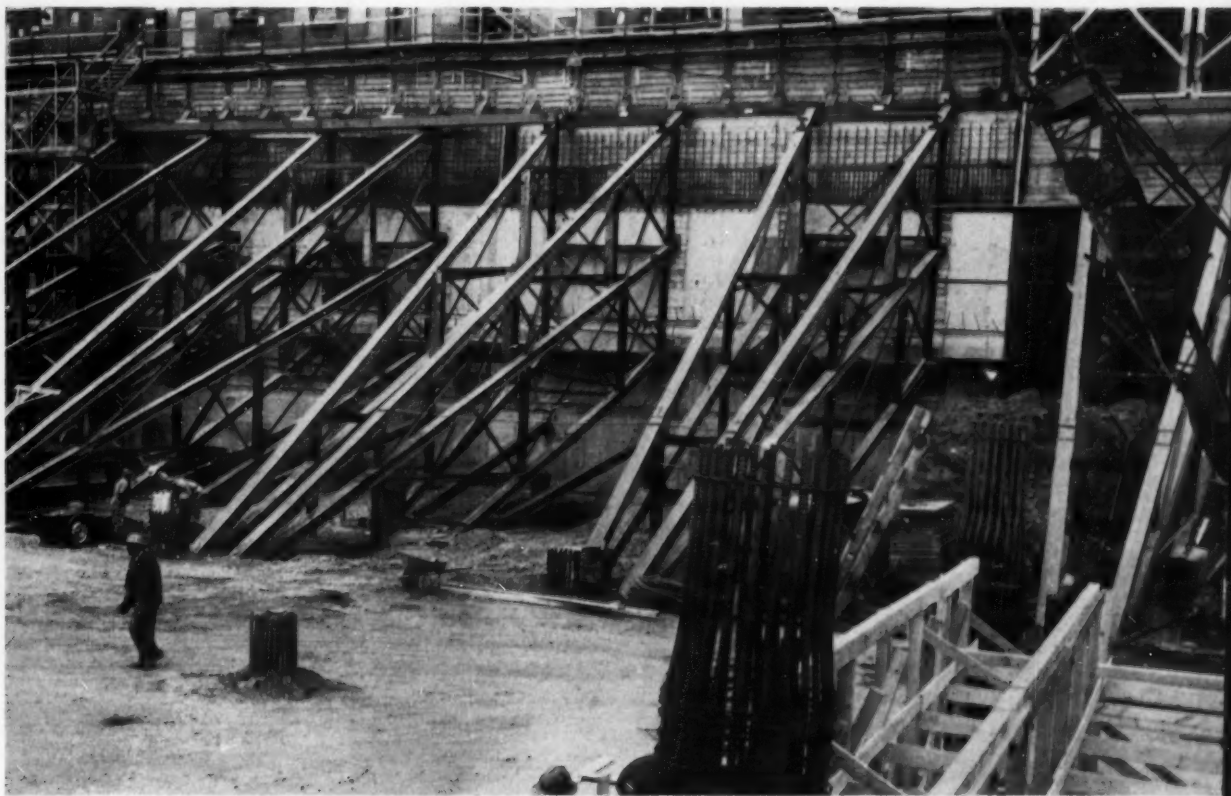
Preliminary Bracing

Since excavation would come right up to the building line on all sides, Smith first had to provide a means for supporting the banks before beginning excavation. For this, he drove 12-in. BP 53-lb soldier piles 6 ft on centers to rock around the perimeter of the plot at the building line.

Rock was 50 ft below grade. Using shovel, dragline, and clamshell, W&K excavated down 22 ft to about 1 ft above the water table and slipped 4x6-in. wood breast boards horizontally between soldier piles to retain the banks to about 6 ft below grade.



CRANE LIFTS piles for cofferdam, first stage in digging of sump for draining water.



WALES WELDED to soldier piles brace tops of rakers while bottom raker ends are wedged against foundation footings and slabs.

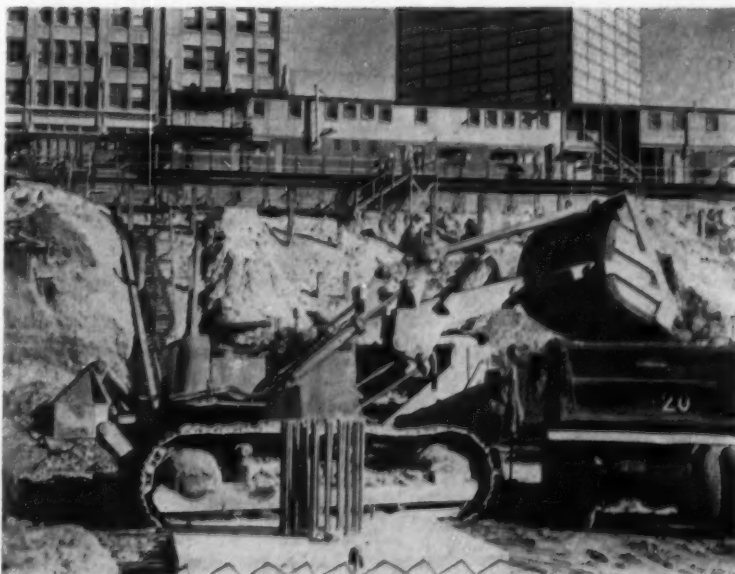
Braces had to be placed in tiers as excavation proceeded 10 ft at a time until bottom was reached more than 50 ft below grade.

Requires Heavy Bracing

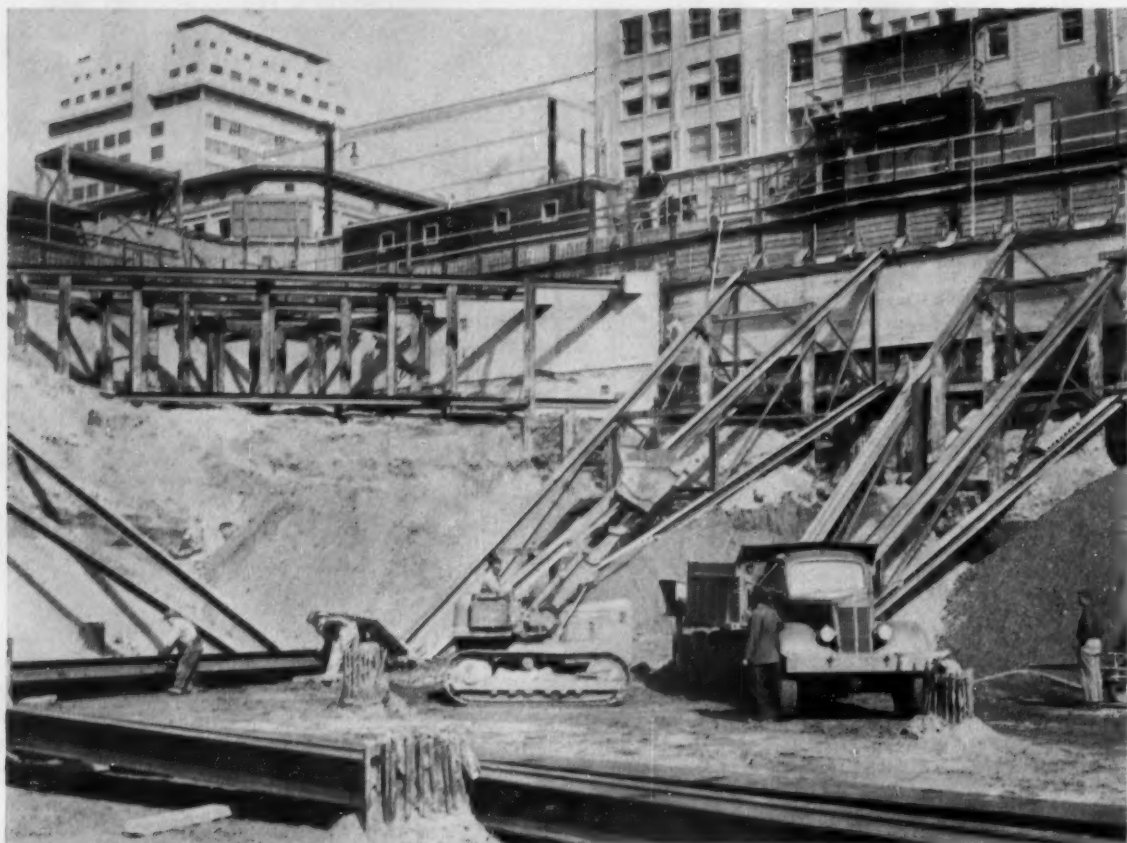
Excavated material included sand, gravel, clay, and a small quantity of gold. Sand and gravel were removed to a nearby processing plant to be cleaned and used as aggregate for concrete in the foundation. Gold was removed in the same process.

Removing Ground Water

Four sumps were dug—one near each corner of the excavation—by driving sheet piling down to bedrock to form a 14x14-ft cofferdam. The core of the cofferdam was excavated, and workmen built into the dam a 12x12-ft frame made up of 12x12-in. timbers spaced vertically 6 ft on centers. The timbers were braced with vertical 4x6's spaced 8 in. on centers. The 4x6's also served as backing for mesh screening tacked against the boards. Once screening was in, workmen filled the 1-ft space between screen and sheet piling with $\frac{3}{4}$ to 1½-in. gravel. (Continued)



BIG LOADER, an Allis-Chalmers HD-20 fitted with 4½-yd bucket, excavates around footings to prepare for placing of rakers, and removes berm after braces have been set in place.



SMALLER LOADER, an HD-5 fitted with 1-yd bucket, scoops material from under hard-to-reach sections of braces and loads it onto dump-truck for removal. Wall at left was built to eliminate the necessity for heavy criss-crossing of corner raker braces.

Sheet piling next was pulled, permitting ground water to flow through gravel and screening into the sump. W&K pumped water out at a rate of 300 gpm night and day until ground water was removed within the excavation to bed rock level. The city sewer system carried the water away.

Smith then excavated to sub grade of the 4th sub slab leaving a berm around the perimeter to hold the embankments until a network of spur raker braces could be placed. In general, sub grade fell into shale bedrock.

Placing Braces

At 4th basement level, footings and slabs for the foundation were poured to provide buttresses against which braces could be wedged. Workmen then welded a continuous 18-in. WF steel beam horizontally to the soldier piles at the top of the berm to serve as a wale.

Smith set 12-in. BP 53-lb raker braces, welding the upper ends to

the wale and wedging the lower ends against the footings. The plans called for the removal of perimeter berm to sub grade with additional wales and rakers installed as excavation progressed. The length of the first tier of rakers (each was up to 90 ft long) presented a problem. There was a risk that the rakers would buckle during removal of the supporting berm. So intermediate support was provided by driving three bents of two soldier piles each, equally spaced between wale and footings and welding the rakers directly to them. Once this was done, steel wedges were driven between concrete footings and raker bottoms to make them tight.

Corners are a Problem

Placing rakers solved all embankment support problems except at the corners. Criss-crossing of rakers would make corner excavation difficult and costly. Smith decided to build an L-shaped cofferdam at each corner, extending

75 ft in each direction. Within the cofferdam, foundation walls could be poured and later supported with diagonal spur bracing.

The outside wall of the cofferdam consisted of breast boards placed between soldier piles previously driven and a facing of steel sheet piles. Inside walls were driven 12 ft away. These were WF soldier piles spaced 6 ft on centers similar to the embankment piling. These piles also were breast-boarded. Workmen excavated the core of the cofferdam, placing horizontal wales and cross struts for support between cofferdam walls. Forming was placed within the cofferdam with cross braces left in place. Reinforcing followed, and 3,000-psi concrete was poured.

Before excavating the corners, Smith drove a series of piles to support diagonal bracing which would follow. He then placed four steel beams diagonally across the corners and welded them to the piles. The plan was to remove inside sheeting for the cofferdam

and cut spur braces from the walls as excavation proceeded to bedrock level.

Excavating to Bedrock

Excavating the berm was relatively simple. Smith used a clamshell to dig out between bracing and a front end loader fitted with a 4½-yd bucket to remove material from places hard to reach by clamshell. Excavation went down 10 ft at a time. When 10-ft points were reached, additional tiers of raker braces were placed and secured against footings.

Pouring Foundation Walls

Since rakers could not be removed during concreting of the foundation walls, forming and concreting had to be done in and around them. This meant that portions of the braces would have to be left imbedded in the concrete.

Smith utilized breast boards for outside forms against the perimeter soldier piles. To secure inside forms, he welded studs to the horizontal wales to which tie bolts could be screwed. Plywood ⅝-in. thick, boxed out to permit rakers to pass, was used for the inside form faces. Wales then were placed and secured by ties to the studs. Reinforcing and concreting followed.

A city street originally passed through the area and had to be removed for the job. The department store was to go on one side of the street and the hotel on the other. But the four sub floors were to cover the entire site. City officials permitted the street's removal but demanded it be restored to use as soon as possible. This meant that structural slabs in that area had to be started before the long foundation walls were placed. Once they were in place and traffic restored, work resumed on the foundation walls and remaining structural slabs.

Removal of rakers will be the last phase of the foundation work. When all four floors of slab are placed, the rakers—where possible—will be slipped out of boxed-out sections of wall and slab. Where not possible, they will be burned out and sections removed in pieces for use on the superstructure. Perimeter soldier piles will be left in place.

Asst. project manager for W&K is J. E. Smith. Al McGee is resident neer. Ellery Lapham is superintendent.



INGENIOUS DIGGING DEVICE dreamed up by contractor is this poke used to break up the rock at the bottom of the sumps. It is just a pointed steel shaft fitted to a pile hammer.



SMALL AREA of building's four sub-slabs had to be built up to grade before foundation walls were poured in order to restore street (background) which will cut through the site.



SELF-PROPELLED concrete carts placing deck concrete on a Kansas City bridge resemble a miniature railroad in action. Carts operate on sectionalized monorail to place concrete for less than \$1 a yd compared to \$3 or more by conventional methods.

Concrete Carts Run on Monorail

SELF-PROPELLED concrete carts that run without operators on sectionalized monorail track are cutting \$2 a yd from concrete handling costs in deck paving of the \$8 million new Broadway Bridge across the Missouri River at Kansas City.

The rigs—called Railporters—are manufactured by Chain Belt Co., Milwaukee, Wis. J. A. Tobin Construction Co. of Kansas City, holder of a \$600,000 contract to pave the bridge's three water spans and 18 approach spans, expects they will cut its concrete handling costs from a budget figure of \$38,000 to about \$18,000.

With conventional motorized buggies and ramps, Tobin had figured costs would have been \$3 a yd, perhaps more. With the Railporters, costs are less than \$1 a yd. And Tobin is able to move 40 yd of concrete per hr on 1,400-ft runs.

The Railporter is a 13-cu-ft rail-type hopper car powered by a 6-

hp, air-cooled gasoline engine. It travels on sectionalized monorail at a rate of 300 fpm and can climb grades of up to 10%. Payload capacity is 1,400 lb, and this can be doubled by attaching a 13-cu-ft trailer to the powered unit.

No operator rides the rig. It is loaded at the point of supply and sent on its way simply by engaging a clutch lever. When it reaches its destination it stops automatically when the clutch is tripped by an arrester pin set in the track. Workmen dump the hopper, re-engage the clutch lever, and start the unit back to its loading point. Outboard rollers riding along the sides of the rail keep both the powered unit and the trailer upright.

The lightweight rails come in sections 4, 6, and 12 ft long. They are supported at each joint by adjustable upright stands and joined by slip pin connections. Two workmen can set up more than 100 ft of rail in 20 min.

Tobin stumbled across the Railporter almost by accident. When Robert A. Mandigo, the firm's estimating engineer, first looked over the job, he figured on using either Pumpcrete or motorized buggies. Slabs required 6½ in. of lightweight concrete (Haydite) topped by 3½ in. of asphaltic concrete wearing surface. And concrete would have to be carried on runs of up to 1,400 ft.

The contractor wanted to avoid using motor buggies. Operating engineers in Kansas City claimed the right to run the buggies, instead of lower paid laborers, and that figured to be too expensive. So Tobin decided to put in two Pumpcrete machines and pipe concrete from the shore to the water spans. Mandigo figured machine rental and handling at \$38,000.

But when he phoned Chain Belt Co. to order the machines, he was told he couldn't pump lightweight concrete. It would clog the pipes.

There seemed to be no choice but to build wood ramps out over the bridge deck and hire operating engineers to run motorized buggies.

"It looked like our handling costs would shoot way over budget," Mandigo said.

Then, Chain Belt suggested Tobin try the Railporter, a new product the company was planning to introduce to the construction industry. Tobin agreed and ordered three powered units with trailers. While waiting for delivery, he formed up the deck slab.

The bridge is a structural steel, tied arch. Its four-lane roadway is 54 ft wide and divided by a 2-ft steel median strip. Tobin is paving ten approach spans on the south, eight spans on the north approach, and three river spans.

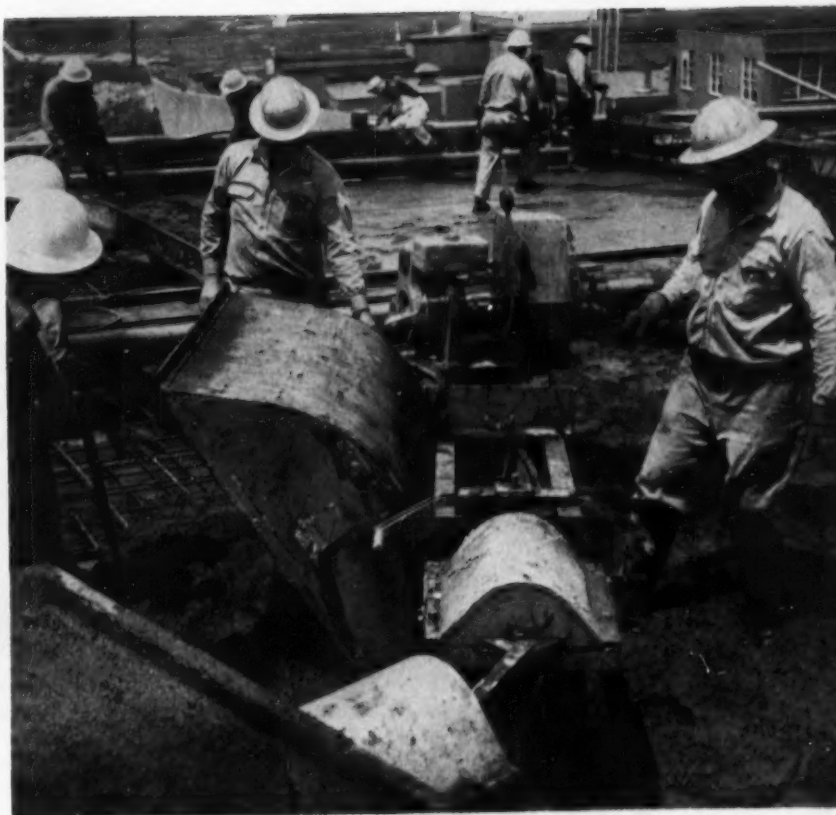
Forming consists of double 2x8-in. wood wales anchored by Superior coiled saddles to the bridge's floor beams at right angles and on 6 ft centers. Parallel to the beams are 2x6-in. wood joists on 12-in. centers topped by 3/4-in. plywood.

Tobin ran the monorail in a straight 1,400-ft run down one side of the roadway, looped it around the 54-ft width of the deck, and brought it back in a straight run on the other side of the roadway. They also built a stand-by loop so that they could pour the most distant sections of paving, remove 12-ft sections of track from each side, and connect up the stand-by loop to continue the pour without delay. Then they leapfrog the first loop over the second so it is in position for the next shortening of the rail. Working three buckets, a crane at ground level places concrete in a double-discharge hopper alongside the monorail. One man stationed at the hopper discharges the buckets. Another loads hopper concrete into the Railporter.

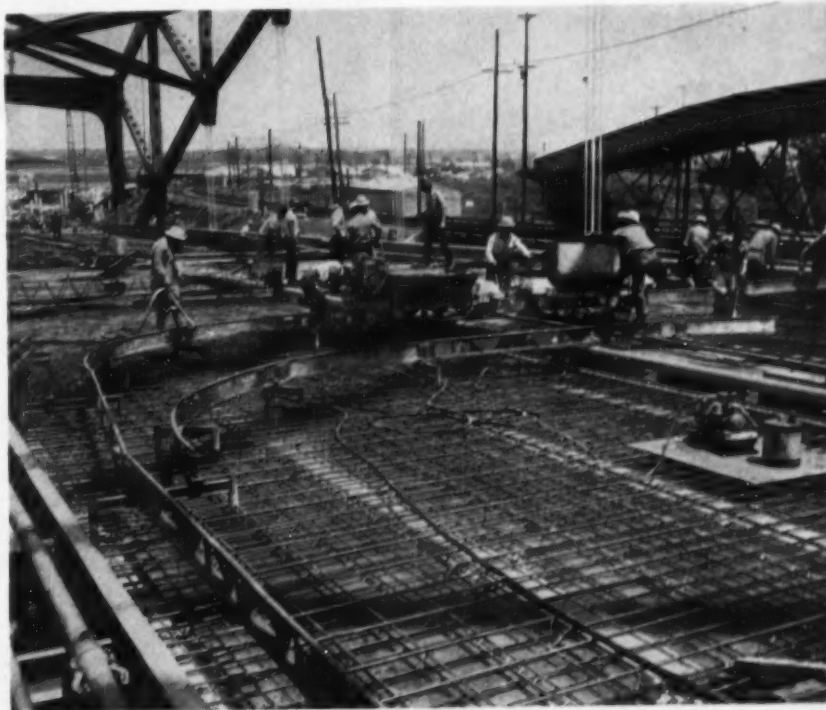
For the approach spans, transit-mix trucks load concrete directly into the Railporter, and the transit-mix man engages the clutch to set the cart in motion.

Tobin has contracts to pave 12 bridges on the Kansas Turnpike, and they plan to use the Railporter on these jobs. "Why not," Mandigo said, "there's no limit to the types of job the rig can be used for. And concrete isn't the only material it can carry."

Chain Belt says the selling price of the Railporter depends on how large an order is involved. On an average, one power unit, one trailer, 300 ft of track, and a two-wheeled, pneumatic-tired carrier cost about \$4,300.



A PULL OF THE LEVER dumps 13 cu ft of concrete. Simply engaging clutch lever sends cart once more on its way. Arrestor pins in the track stops cart at designated spot.



LEAP-FROGGING a stand-by section of curved end rail over the end section in use permits the contractor to shorten the track in 12-ft lengths without interrupting the pour.



CHAMPION MASONRY SAW, mounted on job-built frame so that it rides vertically on tracks (above), is operated by two-man crew. One man (right) holds blade against granite while other man handles chain fall to raise and lower the saw on its tracks.



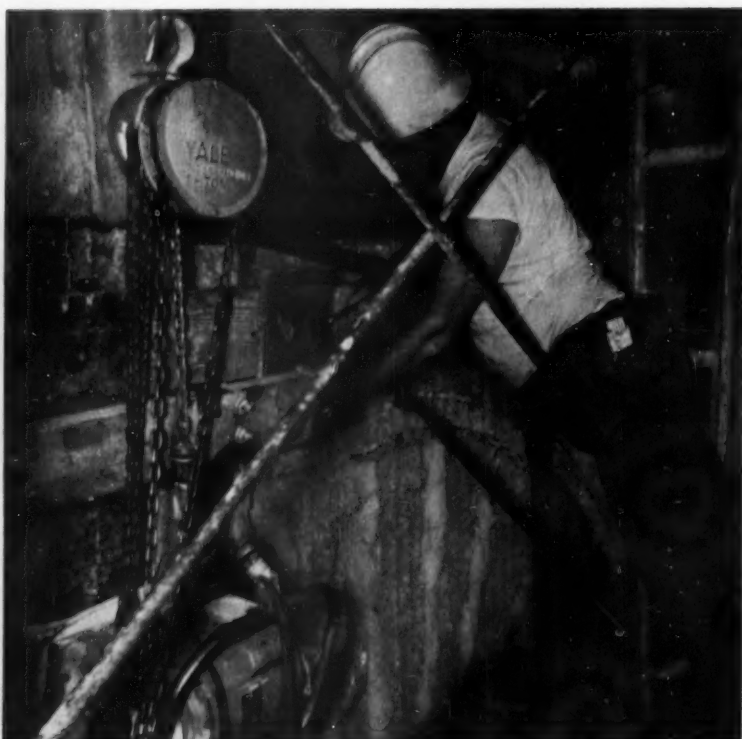
Saws On Tracks Strip Facing

WITH MASONRY SAWS adapted to operate in a vertical plane, the Maxon Construction Co. of Dayton, Ohio, cut 210 tons of granite facing from a Dayton office building in half the time it would have taken with air hammers or flame cutters.

The cutting rig, designed by Maxon superintendent Don Hopkins, is a Champion masonry saw that rides vertically on $2\frac{1}{2} \times 2\frac{1}{2}$ -in. angle iron tracks set 2 ft apart on a wooden frame. The frame is bolted top and bottom to 2x6's running horizontally across the face of the building.

Two men operate the rig. One man pushes against a long pole to control the depth of cut, and the other man operates a 1-ton Yale Load King 5-part chain hoist to raise and lower the saw on its tracks.

Maxon used four saws on the job, one with a 5-ft track and three others with 13-ft tracks. Each saw averaged a 5-in. deep, 8-ft long cut per hr, including setting up time. The cut actually varied from $\frac{1}{4}$ to 8-in. deep and from 4 to 12 ft long, depending upon the surface at the point of cut.



AFTER VERTICAL RUN is completed the entire cutting rig, including rails, is unbolted and moved to next set of holes spaced at $4\frac{1}{2}$ -in. intervals along 2x6 horizontal frame.

To move the cutting rig horizontally after it had finished a vertical run, holes were drilled $4\frac{1}{2}$ -in. apart in the 2x6's that held the frame against the granite. After each vertical run, the entire rig was unbolted from the 2x6's and moved to the next cutting position. Set up time was 10 min.

Maxon decided to make the interval $4\frac{1}{2}$ in. between cuts because this spacing made it easy for workmen to remove the sliced stone with granite sets and sledge hammers after the saw had made several vertical cuts.

The success of the operation depended upon finding a blade that would stand up under rough treatment. Eight blades were tested on the job by John Pietrzak, Maxon foreman, and all but one gummed up within 3 to 8 hr. The blade that continued to run smoothly was a Diamond Tool Associates No. 150 14-in. dia blade. Maxon used this blade exclusively.

It took just 90 days to remove 210 tons of stone from the first six stories of a 12-story, 66-yr-old, downtown office building that remained fully occupied during the operation. In addition to doing the job twice as fast as any other method considered, the job-designed cutting rig had these advantages:

1. It cost relatively little to adapt the masonry saws to cut in a vertical plane.
2. The cutting rigs could be operated by personnel not familiar with granite cutting.
3. The operation was relatively quiet, and the saws did not exert shock loads on the aging building.

When Maxon first got the job, Louis Krabacher, Maxon's masonry superintendent, considered two other methods of removing the granite facing. Although Maxon's personnel has used air hammers on similar jobs and are familiar with the technique, Krabacher vetoed this method because (1) it would have taken 200 days to remove the granite; (2) it would have been a noisy operation, and the building was occupied during the entire job; and (3) air hammers would generate shock loads on the structure.

Next, Krabacher investigated the possibility of using a jet piercing oxygen flame to burn cuts at regular intervals in the stone. Air hammers then could remove the stone left between the cuts. This technique has been used successfully in granite quarries, and Kra-



ONE MAN HOLDS granite set while other man swings sledge to loosen and remove $4\frac{1}{2}$ -in. wide granite section. Cuts varied from $\frac{1}{4}$ to 8 in. deep and from 4 to 12 ft long.



MOUNTED HORIZONTALLY on same rail frame used for masonry saws, Molco diamond core drill pushes 17 to 40 in. through granite for diagonal braces to support marquee.

SAWS CUT GRANITE...

Continued

bacher believes that it could be modified for building renovation jobs. If so, unskilled personnel could do the job rapidly.

This idea was abandoned, however, because Krabacher could not find a rig that would be sufficiently mobile. He also was unable to find a way to get good control over the depth of cut, and he hesitated to use a method that would require quantities of oxygen and kerosene because it would create a hazard to the building and its occupants.

Although flame cutters were not used extensively, Maxon did burn stone with a low pressure oxygen flame in places where only $\frac{1}{4}$ to 2-in. of granite remained to be cut.

Maxon has finished removing the granite with the adapted masonry saws and now is setting a 43-ft rise of Mt. Airy, N. C., granite that will be topped with a 26-ft rise of Indiana limestone.

The new stone is secured to the building with Z-type anchors manufactured to Maxon's specifications by the Dayton Sure Grip & Shore Co. The anchors, $\frac{3}{16}$ -in. thick and 1-in. wide, are screwed into $1\frac{1}{2}$ -in. deep, $\frac{1}{2}$ -in. dia Star Tempin expansion shields.

The new slabs range from $1\frac{1}{3}\times 2$ to $3\frac{1}{3}\times 6\frac{3}{4}$ ft and from 4 to 12-in. thick, depending upon whether they are placed at the base ashler, or cornice. The stone is delivered to the job with $1\frac{1}{4}$ -in. deep notches for the Z-type anchors already cut. Anchors are placed for each 2 sq ft of new stone. After the stone is secured with anchors, a grout of Atlas white portland cement and pea gravel is placed by hand between the new stone and the building's surface.

Maxon devised another special rig to drill 2-in. dia holes for the diagonal braces of a large marquee. The braces extend from 17 to 40-in. deep through granite. A 2-in. Molco diamond core drill, mounted horizontally on the same rail frame that was used for the masonry saws, drills the holes.

The core drill is powered by a 1750-rpm, 220-v, $1\frac{1}{2}$ -hp Valley motor. A universal joint, a thrust bearing, and a water swivel are mounted on a shaft ahead of the motor. Behind the motor on the same shaft is a bow wheel that turns a screw to feed 2-in. dia pipe behind the core drill.



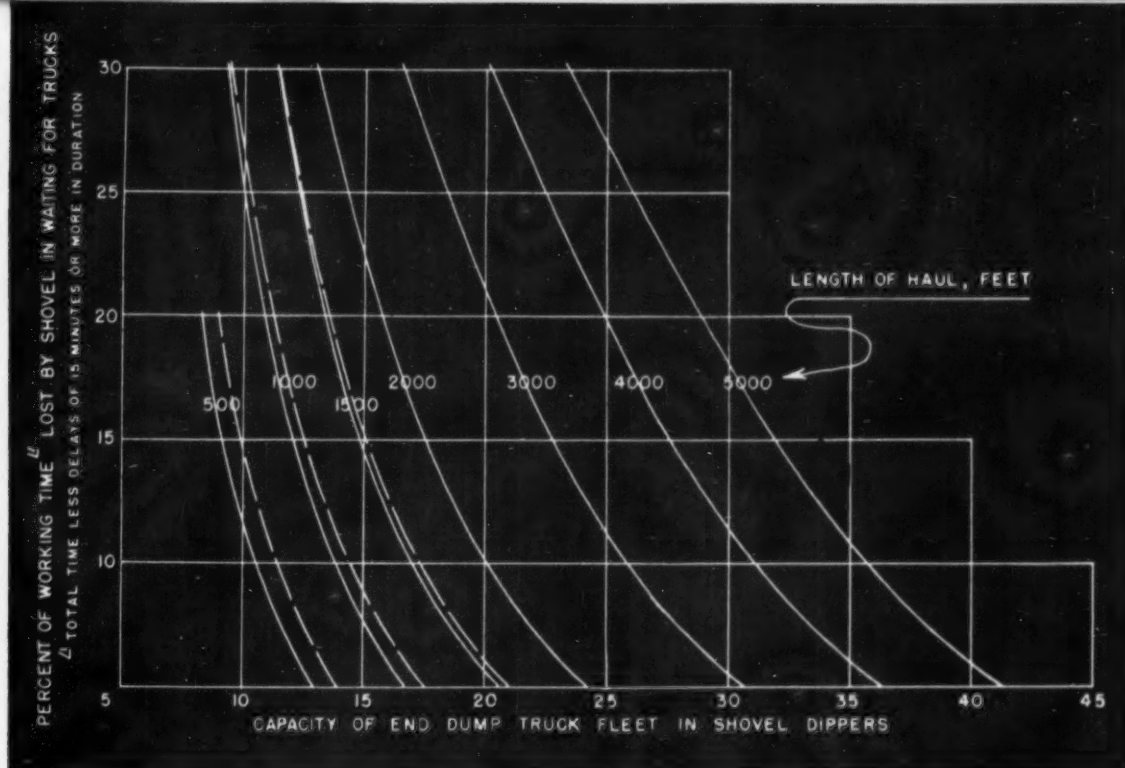
LOW PRESSURE OXYGEN FLAME burns off final $\frac{1}{4}$ to 2 in. of granite facing when it cannot be reached with saws. Maxon first considered using flame cutters for entire job.



HOLES ARE DRILLED $1\frac{1}{2}$ -in. deep for $\frac{1}{2}$ -in. dia Star Tempin expansion shields. Shields hold specially-designed Z-type anchors that secure new stone to the building wall.

Maxon burns a 8-in. deep hole with a low pressure oxygen flame and finishes the job with the core drill. In operation, the screw provides the forward motion, and the depth of cut is controlled by the length of pipe delivered behind the core drill by the screw feed. The universal joint and the thrust bearing relieves the motor of strain.

The 66-yr-old building, recently purchased by the Gem City Savings Association, is adjacent to Gem City's modern two-story building. The first six floors were erected as a masonry supported structure, and in 1919 six more floors were added after steel columns were placed inside the existing building.



Intelligent use of these curves will help you determine . . .

How Many Trucks You Need per Shovel

EQUIPMENT OUTPUT STUDIES on power-shovel grading jobs, made by the Bureau of Public Roads' Production Cost Unit, show certain relationships between:

1. Length of haul.
2. Capacity of an end-dump truck fleet in terms of shovel-dipper capacity.
3. Percent of shovel time lost in waiting for trucks.

These relationships are charted in the curves above. They are based on observations of shovels with $\frac{3}{4}$ to $2\frac{1}{2}$ -cu yd rated capacities, end-dump trucks of 4 to 14-yd struck capacity, and average haul road conditions.

Easy digging conditions coupled with short hauls require a noticeable increase in hauling units. For any given fleet, this is reflected in increased waits by the shovel for trucks. The dashed lines on the charts indicate values for easy digging on hauls of 500, 1,000, and 1,500 ft. At 2,000 ft and above, easy digging did not significantly affect normal values.

With respect to the number of dipper loads the truck fleet can carry, job experience should be the final criterion, of course. However, a general indication of typical dipper-load capacities of two common

sizes of end-dump trucks operating with four sizes of shovels is shown in an accompanying table.

With table and chart, an indication of waits by the shovel for trucks can be determined for certain given conditions. As an example, assume that 10-yd end-dump trucks are being used with a 2-yd shovel, and that the haul is 3,000 ft. The table shows that it will take 5.5 dipper loads to fill each truck. Fleets of 3, 4, 5, or 6 trucks will then have capacities of 16.5, 22, 27.5, and 33 dippers respectively.

Entering the chart with these various fleet capacities, we find that, on a 3,000-ft haul, three trucks will keep the shovel waiting about 30% of the working time, four trucks will reduce this to 16%, five trucks to 8%, and six trucks to less than 5%.

Furthermore, the BPR study indicates an empirical relationship between shovel time lost in waiting for trucks, and truck time lost in waiting for the shovel. When expressed as a percentage of the working time (total time less delays of 15 min or more duration) the sum of these two time losses normally adds up to 29.

Applying this empirical relation-

Average Number of Shovel Dippers Required to Load End Dump Trucks

Shovel size	Struck capacity of trucks	
	10 cu yds	5½ cu yds
$\frac{3}{4}$ cu. yd.	—	7.0
1½ " "	7.2	3.8
2 " "	5.5	2.9
2½ " "	4.2	2.3

ship to our example, we find that a three-truck fleet would expect to lose no time in waits at the shovel (29% minus 30%), four trucks would lose 13% of their time in waits (29% minus 16%), five trucks 21%, and six trucks more than 24%.

It must be remembered that seldom, if ever, will a particular job have all the characteristics of an "average" one. Effects of such variables as excessive grades, mechanical condition of the equipment, operator skill, material classification, and others must be given due consideration. Nevertheless, the above data from Report 31 of the Highway Research Board's Special Committee on Highway Equipment indicate time loss factors and relationships that will help you determine how many trucks to assign to each shovel.

Trying to Cut Equipment Downtime

THESE 11 MEN are charter members of a group organized to cut down the expense and effort required to keep construction equipment in good operating condition. They form the subcommittee on Ease of Maintenance of the Construction and Industrial Machinery Technical Committee (CIMTC) of the Society of Automotive Engineers (SAE).

Theirs is a challenging, long-range job. They don't expect quick results; their work won't begin to bear fruit until equipment now on the drawing board or in an early planning stage is ready to go into service.

Actually, the subcommittee is just starting its work; it met for the first time April 4 of this year, and its third meeting is scheduled for September. But individual members of the subcommittee have been carrying out ease of maintenance studies for several years.

The Corps of Engineers started the ball rolling. Shortly after World War II, the Engineers began an ease of maintenance study to learn what might be done to reduce equipment downtime. By the summer of 1952, the Corps of Engineers was ready to show equipment manufacturers and the public what it had learned.

These studies by the Engineers were only feasibility investigations involving two of the most important tools of the Combat Engineers—the crawler tractor and the motor grader. But they proved how much might be accomplished if construction machines were designed with a view toward ease of maintenance.

The motor grader studies showed that the manhours required for installation of components after minor repairs could be reduced anywhere from 55 to 87% depending on the particular operation. In



R. W. Beal
Corps of Engineers
(Chairman)



R. C. Navarin
Corps of Engineers
(Secretary)



G. Mork
Bucyrus-Erie



A. G. Heisel
Caterpillar



H. H. Bidwell
Allis-Chalmers



E. Kemp
Euclid



L. Burns
Barber-Greene

addition, they proved it was possible to eliminate some special tools and to perform certain maintenance operations with less highly skilled mechanics.

For example, they found ways to reduce the time required to remove and replace the engine and radiator from 7.9 to 1.3 manhours—a reduction of 84%. They achieved this time savings by reducing the number of bolts and cap screws, installing quick disconnects on all fuel, water, hydraulic, and elec-

trical lines, mounting on (or connecting to) the engine all components, and installing lifting eyes and realignment devices.

The studies of a crawler tractor were equally revealing. To work on the radiator, hydraulic unit, or engine of a standard model it was necessary to remove the hydraulic assembly and its components separately. The Engineers rearranged the hydraulic lines and placed lifting eyes in the proper places so that the complete assembly could be removed as a unit for access to the engine, radiator, and hydraulic system.

Then, the Engineer Research and Development Laboratories at Fort Belvoir, Va., went a step further and conducted a limited survey among contractors to learn what interest they might have in the subject of ease of maintenance. They found contractors complaining that many maintenance operations were too expensive because mechanics had to handle a number of components before they could reach the part needing repair. Here are a few examples of contractor complaints about motor graders:

- To pull the clutch or transmission, you have to remove the engine first.
- To change the differential, you have to remove the fuel tank.
- To replace the bull gears and pinion on the rear axle, you have to remove the fuel tank and the rear axle.

Complaints about a standard tractor included these:

- To remove the engine, the equalizer spring must be disconnected and the tractor jacked up. This takes an additional 3 to 4 hrs.
- The flywheel cannot be removed without first removing the

engine. A larger bell housing is required.

- To remove the starter motor, the fuel injection pump first must be removed. This adds 1 to 2 manhours to the job.

- The oil drain plug is difficult to remove because the inspection hole is too small. Sometimes it is necessary to remove the belly pan. That makes the operation a 3-hr job.

R. C. Navarin of the Mechanical Engineering Department of the ERDL at Fort Belvoir, summed up the situation this way in a paper presented at SAE's Golden Anniversary Tractor Meeting last year:

"The design and arrangements of components of many machines," he said, "sometimes appear to have been deliberately selected to discourage maintenance by making the maintenance operation as difficult as possible. Every efficient operator will agree that proper maintenance is a 'must' for satisfactory equipment performance. However, many machines require entirely too much time for the performance of necessary maintenance operations, purely because of the inaccessibility of components or the complexity of the individual maintenance operations."

Manufacturers, too, had begun their own studies on ease of maintenance before the subcommittee was formed. And some had achieved surprising results. George Mork of Bucyrus-Erie, for example, had worked out ways to substitute bearings of various types and nylon dry joints so that he could reduce the number of grease fittings on a standard excavator from 94 to 13. And he was able to replace the 72 different sizes and 12 different diameters of bolts in the machine with only 17 sizes and 4 diameters.

Most manufacturers of construction equipment already emphasize the importance of making their products easier to maintain. The subcommittee now offers them an opportunity for a coordinated effort which includes liaison with the military, evaluation of procedures and techniques, and dissemination of information.

The subcommittee has laid down for itself an ambitious program of proposed studies. These are among the possibilities its members will investigate:

- Reduction of lubrication points by substituting non-lubricating connections.

(Continued on page 200)



W. P. Edwards
LeTourneau-Westinghouse



H. V. Parsley
International Harvester



W. C. Burton
Gradall



H. C. Wuestenberg
Austin-Western
(Consultant)

Concrete Placing Hits Fast Clip



GENERATING UNITS on American half of 3,200-ft structure begin to take shape as excavation moves toward international border. Note the huge batch plant at edge of hole.

CONCRETE PLACING at the Barnhart generating station on the St. Lawrence Power Project is swinging into high gear.

On the American half of the 3,200-ft structure, concrete is rising in nearly all of 16 generating units. Canadians are just beginning to pour the first of 16 units in their half, but they have made extensive progress on a huge abutment that will tie in with a diversion canal structure.

Scheduled for completion early in 1960, the American half of the structure requires 1,120,000 yd of

concrete. A \$35,849,000 contract with the Power Authority of New York is being carried out by a joint-venture of Perini, Walsh, Morrison-Knudsen, Kiewit, Utah. It's sponsor is B. Perini & Sons of Framingham, Mass.

Fast Placing

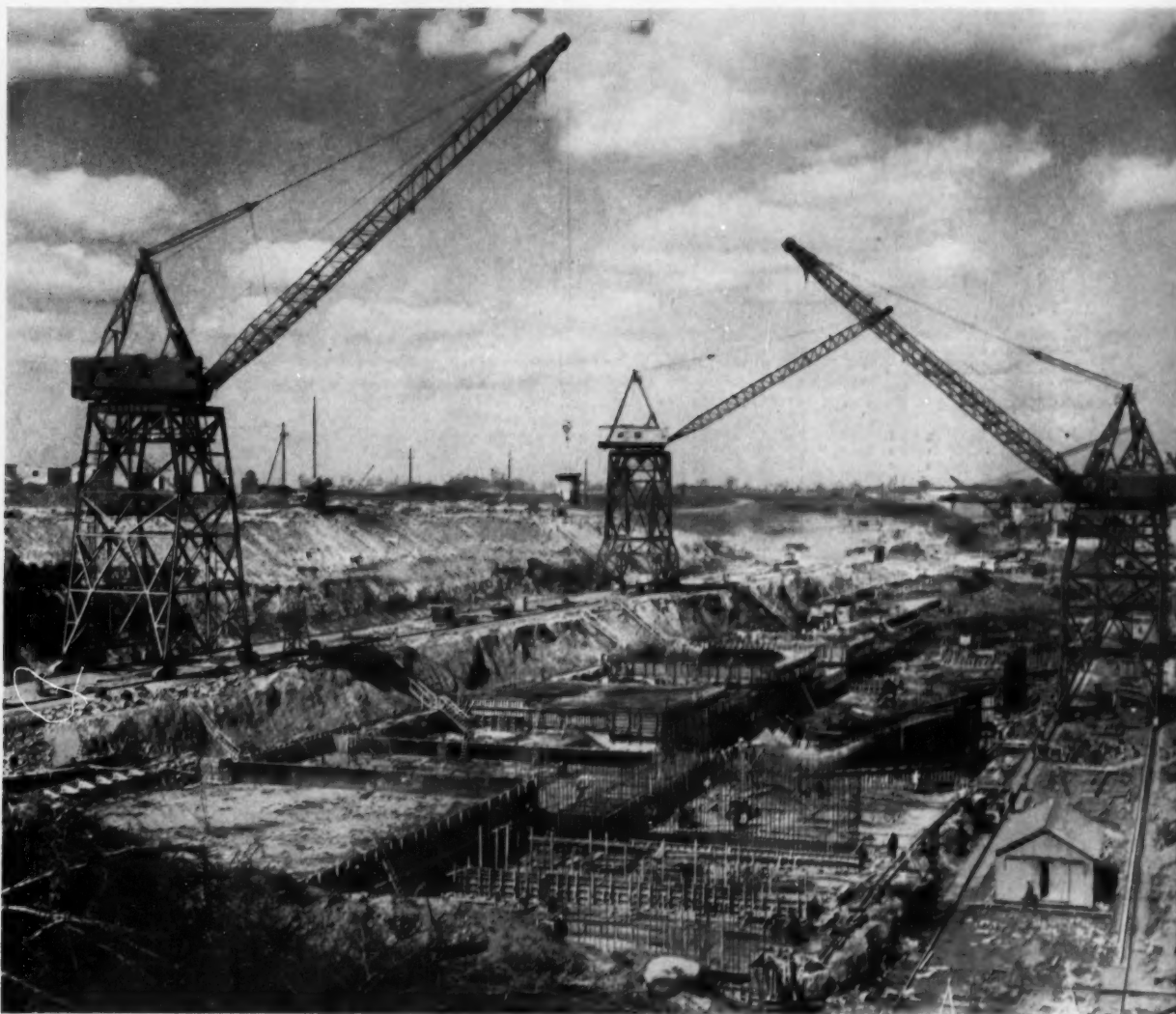
Perini's placing rate is steadily increasing and soon will reach 25,000 yd a week. When line drilling and excavation are completed, the contractor will pour concrete along the entire 1,600-ft length.

Maintaining a flow of 25,000 yd

a week requires a tremendous plant. Aggregates produced by Tecon Corp's plant (CM&E Jan, '56, p.60) are brought in by rail to a double-track unloading spur adjacent to a stockpile area. Cars are unloaded one at a time.

It's a fast operation. In fact, more than 45 cars are emptied every 8-hr shift, and practically the entire job is controlled by one man. Stationed in an overhead control room, he moves a car into position with a tugger and then places a Hewitt-Robbins shaker on top. The tugger is a Joy winch

at St. Lawrence Powerhouse



FOUR WASHINGTON gantry cranes running parallel to dam axis swing concrete buckets over big monoliths. At peak of job, cranes will place 25,000 yd of concrete per week.

actuated by remotely controlled air cylinders. Aggregate falls into a hopper below the track and moves to an inclined belt which feeds a Barber-Greene overhead stockpiling conveyor.

One-Man Control

The control-room operator also handles an under-car conveyor, the inclined belt, and a tripper which rides the overhead conveyor and unloads it over the proper stockpile. Trains are scheduled so that cars carrying the same size aggregate can be unloaded alternately

on each one of the double tracks.

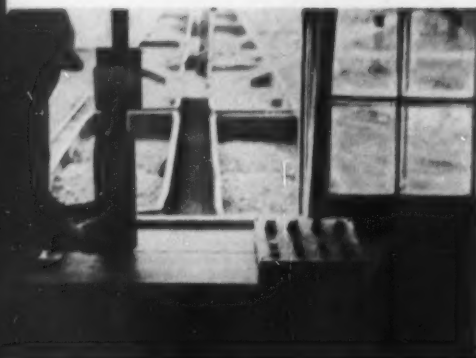
Beneath the stockpiles a long conveyor running in a reclaiming tunnel taps aggregate and carries it out to a TelSmith rinsing screen. Specifications require that all aggregate be washed and rescreened. The material is carried on an inclined conveyor to a TelSmith rescreening tower atop a Johnson automatic batch plant where one man controls the tunnel, rinser, conveyors, and rescreening unit. Aggregates get a final sizing and then fall into the proper bins.

Batches are handled automati-

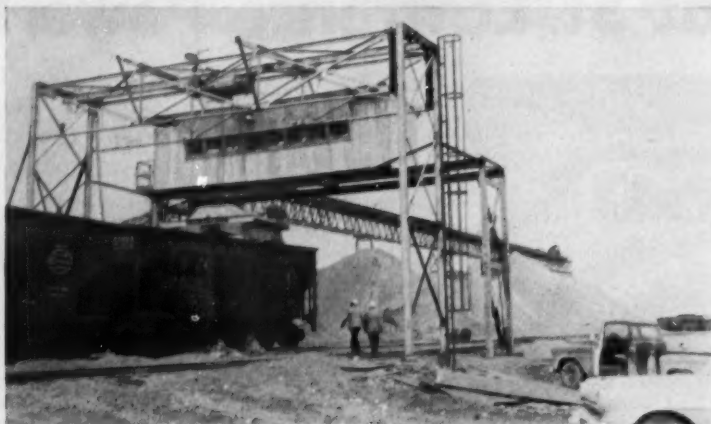
cally and mixed in four 4-yd Koehring tilting-type mixers. The plant's capacity is 240 yd per hr.

Perini has made several modifications on the plant. In the beginning, a motor transmitted power up to the rescreening unit by vertical V-belts. But loaded screens would sink, the belts develop slack, and the system lose efficiency. The contractor solved the problem by mounting the motor at the screen level so that loaded screens could drop without shortening the distance to the motor. (Continued on next page)

One man controls car puller, shaker, belts, and tripper



OPERATOR in overhead control room positions stone car and then places shaker on top.



SHAKER empties car over hopper which feeds conveyor system leading to stockpiles. One man in tower controls all operations. Setup handles double line of stone cars.

ST. LAWRENCE POWERHOUSE... continued

Other modifications include installation of external vibrators on cobble bins and setting a baffle in the loading hopper to fill two concrete-hauling units at once.

Cement handling is unusual. Bulk cement from Quebec City is hauled in river boats to a wharf on the Cornwall Canal in Canada, about 3,600 ft from Perini's batch plant.

Boats carrying 2,700 tons of cement are unloaded by two Fuller-Kinyon remotely-controlled units. They pump 500 bbl per hr to a pair of 7,500-bbl storage silos a few hundred feet away. Here, a special Fuller-Kinyon unit pumps the cement through a 10-in. pipe 3,600 ft to a pair of 7,500-bbl silos at the batch plant. Under 35 psi pressure, cement moves at the rate of 275 bbl per hr.

At the batch plant, a third silo, with a capacity of 2,500 bbl, stores natural cement brought in by rail. A 3-way valve at the unloader is locked to prevent unintentional mixing of natural and portland cement. Only shift superintendents have the key.

Another modification of the cement system is a silo hose for loading trailers that haul to nearby Long Sault Dam.

Concrete Handling

Concrete handling is a feature of the job. Instead of following the conventional method of hauling buckets from mixing plant to site, Perini carries concrete in pairs of Koehring Dumptor bodies mounted



BELT TRIPPER on overhead stockpiling conveyor also is operated by push buttons from control room. Contractor dislikes ladders, keeps piles high to cut breakage.

on Euclid trucks. They discharge directly into buckets. No switching is required. A crane swings a bucket alongside a truck, a Dumptor quickly fills the bucket, and the crane swings it away. The seconds saved by eliminating normal bucket switching seem small, but, added together on a job this big, they make an impressive saving. Besides, the method also makes it possible to leave an elephant trunk attached to the bucket for an entire pour. Intricate pours are numerous and nearly always require elephant trunks.

Key to the system is the Dumptor-mounting Euclid. Perini now

has seven units, and each one is an improvement over the one before.

Dumptor Bodies

Basically, the unit consists of two 4-yd Dumptor bodies mounted on carriages that roll sidewise on the built-up frame of a Euclid TD31. When the truck is in dumping position, a workman turns an air valve near the cab. A 6-in. cylinder pushes one of the carriages, and it rolls on steel I-beam tracks to the edge of the truck frame. When the carriage hits two stops, the Dumptor body tips over and discharges into a bucket. The



The No. 12...OUT IN FRONT ...any way you figure!

That's a big, rugged Caterpillar No. 12 Motor Grader out in front of those fast DW20s. It is maintaining haul roads for Gordon H. Ball of Danville, Calif. The job is the new Lafayette Freeway, where a million and a half yards of earth are being moved.

Mr. Ball's No. 12 is new, but already its owner reports it's doing "a top job." This is no surprise to Mr. Ball, who's been relying on CAT* equipment for 35 years. He knows the No. 12 is out in front four ways: produces more, costs less to operate, costs less to maintain, lasts longer.

For one thing, the No. 12 has Caterpillar's famous oil clutch. This important improvement increases machine life, cuts down on wear, gives you up to 1500 hours' operation without an adjustment.

For another, tubeless tires are now standard equipment—more economical tires that can eliminate the major portion of tire-caused down time.

There are scores of other features which put and keep the 115 HP No. 12 out in front. New simplified starting controls. Accelerator-decelerator pedal. Extremely accurate power controls. Anti-creep brakes that hold adjustments even under heavy loads. Unexcelled visibility. And of course the heart of the No. 12's rugged durability: the time-proved Cat Diesel Engine.

Your dealer will gladly explain in detail why the Cat No. 12 Motor Grader is a smart investment. Call him, he'll demonstrate—right on your own job.

Caterpillar Tractor Co., Peoria, Illinois, U.S.A.

CATERPILLAR*

*Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

**99% OF ALL CAT MOTOR
GRADERS EVER BUILT
ARE STILL ON THE JOB**



RECLAIMING-TUNNEL CONVEYOR under stockpiles carries aggregates to washer. Inclined conveyor picks up material and moves it to rescreening tower atop Johnson batch plant.

cylinder then exerts a backward pull, and the body, aided by a counterweight on back, returns to its normal position.

Several safety locks are required to anchor both the carriage and the body during hauling. The carriage is held tightly against rear stops by a latch that is released by a rod actuated by the forward movement of the air cylinder.

The body is prevented from premature overturning by a latch on the back. When the carriage moves forward, it trips a cable that pulls a dog from the rear latch, freeing the body for tilting.

Compressor

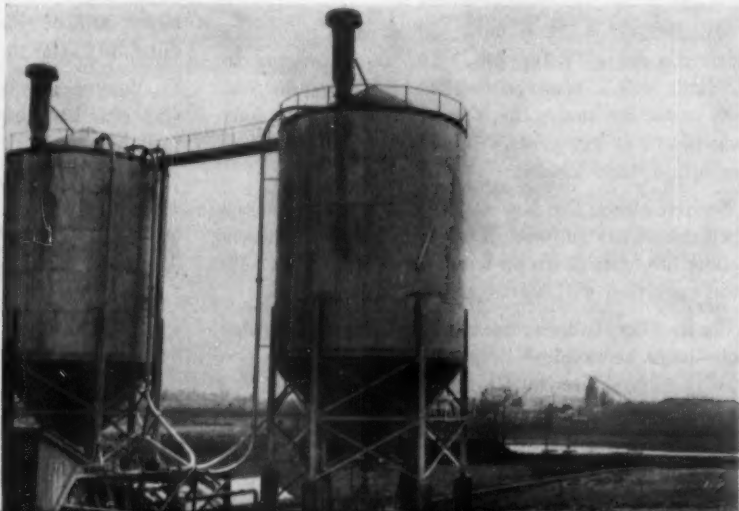
Compressed air is supplied by a 20-cfm compressor mounted under the truck frame and connected to the power takeoff. Two receiver tanks made of pipe are 10 in. in dia and 10 ft long.

Perini has made several improvements on his first model. A 4-in. pipe is hung from one side of the truck to prevent overturning during dumping. The standard Dumptor lip has been extended 2 ft, and a bonnet has been installed on top to cut splashing.

The Dumptor trucks supply concrete at any point along each side of the dam. Concrete walls are being built the full length to serve as bucket-loading docks. Big 4-yd buckets are quickly positioned for loading by simply swinging them against the wall. Round buckets, with funnel-type extensions on top, work better than square buckets because they can be swung close to the wall without jockeying. When elephant trunks are attached, the bucket is swung in at



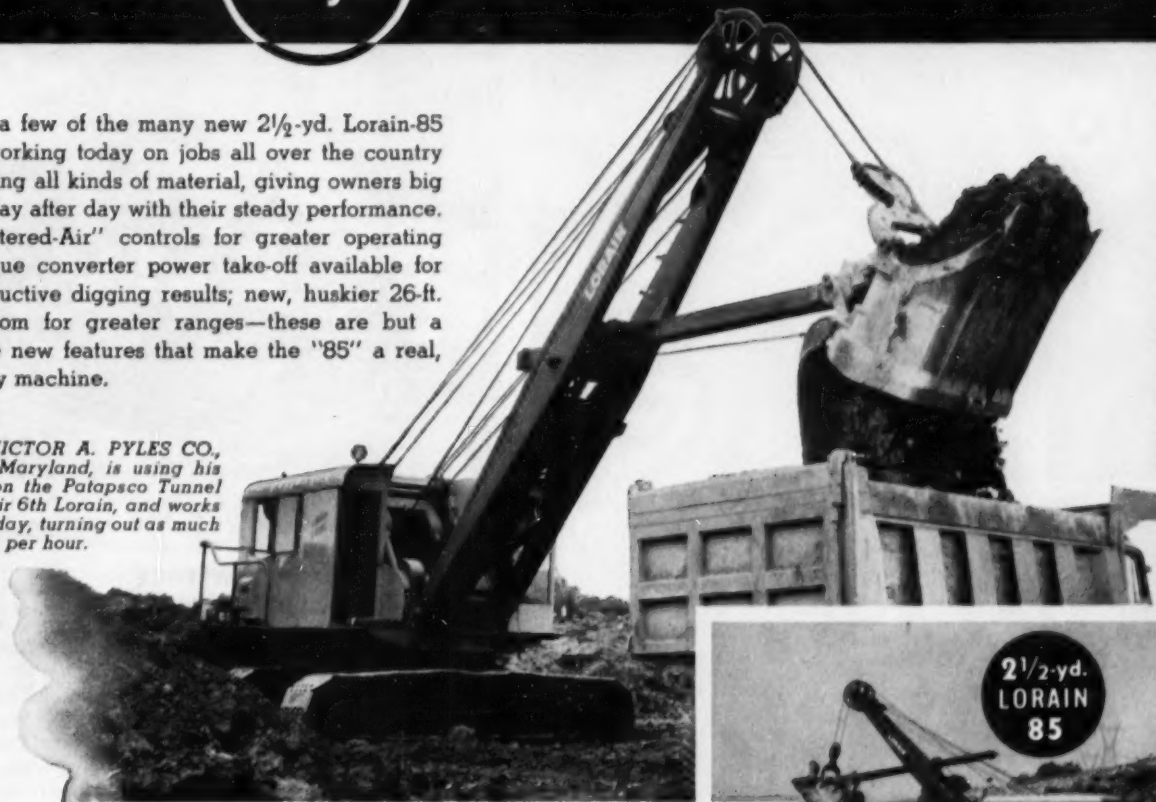
MOBILE PUMP (above) waits on wharf for cement boat. Pumped first to twin silos (right), cement is piped 3,600 ft across international border to batch plant.



Job Views **2½-yd. LORAIN-85 SHOVELS** at work

Here are a few of the many new 2½-yd. Lorain-85 Shovels working today on jobs all over the country . . . handling all kinds of material, giving owners big yardage day after day with their steady performance. New "Metered-Air" controls for greater operating ease; torque converter power take-off available for most productive digging results; new, huskier 26-ft. shovel boom for greater ranges—these are but a few of the new features that make the "85" a real, heavy-duty machine.

At right, VICTOR A. PYLES CO., Baltimore, Maryland, is using his Lorain-85 on the Patapsco Tunnel job. It's their 6th Lorain, and works 20 hours a day, turning out as much as 300 yds. per hour.



C. J. LANGENFELDER & SONS, INC., Baltimore, Md. own 2 Lorain-85 Shovels. Above, one is working near Auburn, Mass., on their 3,300,000 yd. grading contract on the Massachusetts Toll Road. Below, the other is shown digging and loading borrow in Baltimore. Langenfelder has purchased a total of 26 Lorains.



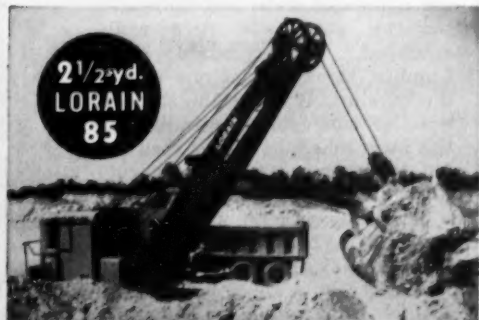
EMIL ANDERSON CONSTRUCTION CO., LTD. used his 2½-yd. Lorain-85 Shovel to dig a diversion tunnel on the Cheakamus Hydroelectric Development Project for the British Columbia Electric Co., Ltd., Vancouver. This is Anderson's 6th Lorain.

CHAS. CAPONE CONSTRUCTION CO., Dedham, Mass., tackle the Massachusetts Expressway job near Braintree, using their 2½-yd. Lorain-85 Shovel to remove a ledge of rock and dirt. This is their 4th Lorain.



LYCOMING CONSTRUCTION CO., Williamsport, Pa., handle tough digging with their 2½-yd. Lorain-85 Shovel on a curve and grade elimination program on Pennsylvania Route 31. Another of Lycoming's 85's works as a crane on a ½-mile long bridge construction on the same job. This is Lycoming's 17th Lorain.

THE THEW SHOVEL CO.
LORAIN, OHIO



THEW LORAIN

Concrete placing follows closely behind excavation



LINE DRILLING of foundation rock advances gradually as Gardner-Denver drills are moved along quarry-bar mounting.



BLASTED FOUNDATION ROCK is excavated by Northwest shovel and loaded into Euclid truck. Air-Trac drills blast holes.



CONCRETE is poured at south end of powerhouse as excavation advances toward international boundary at center of structure. Perini has fleet of about 20 Euclid trucks.

ST. LAWRENCE POWERHOUSE . . . continued

an angle so that the trunk first can be laid on the ground.

Four Washington gantries handle the bulk of concrete placing. Shipped from The Dalles Dam in Oregon, the 40-ton rigs with 125-ft booms operate on upstream and downstream tracks parallel to the dam axis. In the block areas, concrete is placed in 5-ft lifts. Interior vertical joints are cured with Hunt's white compound, and all other areas are watercured. Generally, form handling is done during the day and concrete placing at night. The job is illuminated by light towers salvaged from Lou Perini's Toledo Mud-Hen Stadium. Each tower has thirty-two 1,000-w lamps, providing six candle power in the working area.

Forms

Because the structure is primarily a generating station, form work is more complicated than on conventional dams. Besides 16 draft tubes and scroll cases, there are numerous walls and slabs.

Forms are made in a well-equipped, well-organized shop. Lumber, stockpiled at one end of the building, is fed to the shop on a roller conveyor. Depending on the form schedule, pieces then are fed to various machines for cutting.

The shop is equipped with a Delta 12-in. bench saw, two Delta 16-in. radial saws, a Crescent 36-in. hand saw, a Delta 6-ft jointer,

(Continued on page 71)

ALLIS-CHALMERS ENGINES — 9 to 516 hp
Diesel, gasoline, LP and natural gas
Engines, power units, generating sets

Now...
to meet your needs

MORE

**ALLIS-CHALMERS
ENGINES**



- increased production
- improved standards
- expanded service
- greater parts availability
- more parts interchangeability

The production of Allis-Chalmers engines goes up, up, up to meet your needs. The 1956 production is expected to reach an all-time high — and 1955 output was many percent greater than 1954's. A multi-million-dollar expansion of facilities will further boost production.

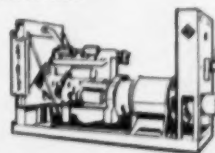
But there are not only *more* engines to meet your needs, there are *better* engines — as Allis-Chalmers research and development continues to pioneer improvements, and as production and inspection standards are set even higher.

Along with this comes an expansion of customer service and greater parts availability, too, as sources of parts and service are moved closer to you.

More and more, it's Allis-Chalmers engines and service to meet your needs.

ALLIS-CHALMERS, BUDA DIVISION, MILWAUKEE 1, WISCONSIN

A complete line of improved engine generator sets from 5 to 300 kw, for emergency and continuous duty, for marine, cooling tower and industrial use.



1954	
1955	
1956 Estimated	

ALLIS-CHALMERS



The 1956 production of Allis-Chalmers engines will reach an all-time high, with output many percent higher than in previous years.

BIRD'S EYE VIEW OF A BONE DRY HOLE



Two-stage MORETRENCH WELLPOINT SYSTEM keeps 38' of water well below subgrade on pump station in Sayreville, New Jersey. Material—fine to coarse sand and clay. For expert pumping—at a saving—get Moretrench on your job! For full details, call our nearest office.

MORETRENCH CORPORATION

Contractor: Wallace J. Wilck, Inc., Perth Amboy, N. J.
Owner: Middlesex County Sewerage Authority, New Jersey.
Engineer: Bogert & Childs, New York.

90 West St.
New York 6

4900 S. Austin Ave.
Chicago 38, Illinois

7701 Interbay Blvd.
Tampa 9, Florida

315 W. 25th St.
Houston 8, Texas

Rockaway
New Jersey

Western Representative: Andrews Machinery of Washington, Inc., Seattle 4, Washington

Canadian Representative: Geo. W. CROTHERS Limited, Toronto, Ontario

Brazilian Representative: Oscar Taves & Co., Ltd., Rio de Janeiro

Dumptors on Eucs Speed Concreting

**ST. LAWRENCE
POWERHOUSE . . .**
continued from page 68

and numerous hand power tools.

Making draft-tube forms is simplified greatly by Blaw-Knox prefabricated steel sectional frames. Ribs are cut and positioned when they arrive on the job. The contractor has only to install wood strips around the rim of each rib, cut the proper bevel and then cover with wood lagging and Harborite plywood.

(Continued on page 74)



MODIFIED DUMPTOR BODY begins to tip over edge of Euclid to discharge 4-yd load of concrete into buckets. System eliminates bucket switching, and speeds placing.



LOCKING MECHANISM on back of Dumptor releases when carriage moves forward, freeing body for tilting. Note counterweight.



CARRIAGE which mounts Dumptor is pushed by air cylinder underneath and rolls on I-beam rails until it hits stops and tilts body.



WORKER turns air valve, carriage rolls sidewise, and Dumptor discharges. Most trucks have hanging leg to prevent overturning.

More proof that **CAT**^{*} **LOWBOWL** Scrapers deliver bigger, faster loads

Handling tough material on the Florida Turnpike, a new
DW21 (Series C) Tractor-No. 470 LOWBOWL Scraper
averaged 128 pay yd. an hour on a 6900-foot round trip

Recent tests on the Florida Turnpike confirm previous reports from other jobs in Iowa, Kansas and New Jersey—the new Caterpillar LOWBOWL Scraper steps up production with bigger, faster loads. Here's proof again that on the job, where results and only results pay off, the new LOWBOWL design delivers a new high in money-making performance.

Says Donald R. Grubbs, Superintendent for Troup Bros., Inc., Miami: "I like the wide-base tires on this new DW21—they help us over this sandy fill. The new LOWBOWL Scraper design also cuts down

our loading time. What's more, we've had very little down time with our Caterpillar equipment."

Before you make your next bid, get the full facts about the new LOWBOWL Scrapers. Your Caterpillar Dealer's salesman carries completely documented details about their productive capacity on this and other jobs. Ask him to show them to you!

Caterpillar Tractor Co., Peoria, Illinois, U.S.A.

CATERPILLAR^{*}

^{*}Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

**BIGGER, FASTER
LOADS WITH CAT
LOWBOWL SCRAPERS**

RESULTS OF FLORIDA TURNPIKE JOB TEST

JOB AND LOCATION: Building 3.8 miles of new road on Florida Turnpike, near Hollywood. The job involves moving about 1,000,000 cu. yd. of sand. The contractor: Troup Bros., Inc., Miami. **CONDITIONS:** Material—very fine, loose white sand with an estimated shrinkage of 25%, borrow to compacted. **Loading**—D9 (Series D) Tractor with torque converter used for pusher. **Haul distance**—3250 feet over loose to damp, compacted sand, maintained by a No. 12 Motor Grader. **Rolling resistance**, 100 lb./ton. **Return distance**—3650 feet. **Grades on haul**—400 feet of 1°-3° adverse and 600 feet of 1°-2.2° adverse.

TIME STUDIES

AVERAGE	DW21-No. 470 LOWBOWL Scraper
Load time . . . . .	.44 min.
Haul time	3.33 min.
Haul speed	11.14 MPH
Spread and turn time (180°) . . . . .	.38 min.
Return time	3.37 min.
Return speed	12.31 MPH
Wait time . . . . .	.39 min.
Total cycle time	7.91 min.
Trips per hour	7.59
Pay yd./trip	16.8
Production pay yd./hr.	128

REMARKS: The loose, fine sand was difficult material to load. In spite of this, average loading time was excellent, due to the fast-loading characteristics of the new No. 470 LOWBOWL Scraper. Average cycle time was excellent, too—a reflection of the new DW21's Turbocharged power and wide-base tires!



The new two-wheel Cat DW21-No. 470 LOWBOWL Scraper

A new four-wheel DW20-No. 456 LOWBOWL Scraper is also available. Both units have a capacity of 25 cu. yd. heaped and 18 cu. yd. struck. Both feature the new Turbocharged, 6-cylinder Caterpillar Engine which delivers 300 HP (maximum output) and 10% more rimpull. New LOWBOWL design loads more material with less resistance clear to the end of the loading cycle. And wide-base tubeless tires, now standard equipment, eliminate the major portion of down time caused by tires. All these and other new features add up to bigger, faster loads for you with Cat LOWBOWL Scrapers!

Steel Draft-Tube Forms Cut Costs, Speed Erection

**ST. LAWRENCE
POWERHOUSE . . .**
continued from page 71

Because the turbines are coming from two different manufacturers, two separate draft-tube shapes are required. Perini has one complete form for each shape, and each will be used eight times. Draft tubes are built up by a number of pours, making it simple to shift panels and have all tubes in various stages of completion.

Personnel

A. R. Berry is project manager, Einar Skinnarland is project engineer, Harry Evans is project superintendent, and V. Pandolfi is mechanical superintendent for B. Perini & Sons, Inc. James Hendricks is resident engineer for Uhl, Hall & Rich, consulting engineers, and W. H. Latham is resident engineer for the New York Power Authority.



INSIDE WALL of draft tube is formed with wood-covered Blaw-Knox steel forms. Draft tubes are poured in several steps. Two complete sets of forms will get eight reuses.



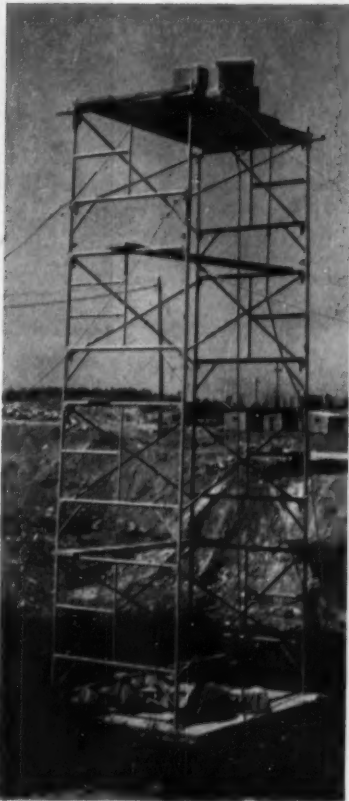
LUMBER is fed to carpenter shop on long Sage roller conveyor.



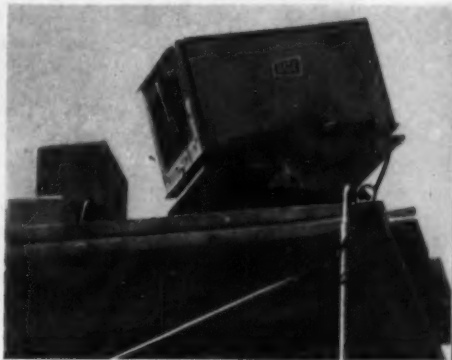
PLYWOOD is placed over lagging to surface draft tube form.



Closed-Circuit TV Brings Job Operations Into Project Manager's Office



STEEL SCAFFOLD 40 ft high at edge of job supports closed-circuit television camera.



TV CAMERA sporting windshield wiper is mounted on remotely controlled table that moves up and down and sidewise. Camera offers choice of four lenses. It also has de-icing fluid.

REMOTE CONTROL closed-circuit television is improving communication and coordination at the St. Lawrence Powerhouse, according to A. R. Berry, Project Manager for B. Perini & Sons. Manufactured by Dage Television Division, the TV system consists of a completely weatherproofed camera installed atop a 40-ft scaffold at the rim of the excavation. Construction operations are televised in detail to a monitor set up in Berry's office.

A control panel adjacent to the monitor gives Berry complete control of all movements of the TV camera. He moves the camera up and down, right or left, chooses one of four lenses mounted on a turret, and focuses.

A special weather-proof camera housing insures operation even under the most difficult conditions. It features a heating unit and blower, a windshield wiper, and windshield washers with de-icing fluid, all operated from the same remote control panel.



PROJECT MANAGER A. R. Berry adjusts control panel to focus on concrete placing.

NEXT MONTH

Rigid maintenance keeps equipment rolling on rugged St. Lawrence Seaway and Power Project. CM&E reports intimate details of field and shop programs.

With Kwik-Mix R-15
Moto-Bug® you get

3 TOOLS IN ONE

15 cu. ft. hopper body — Big-capacity R-15 Moto-Bug hauls concrete, plaster, mortar, brick, tile, and any other construction materials or supplies you shovel, pile or stack into the gravity-dump hopper. It carries up to 2000 pounds or 15 cu. ft. of bulk materials each load — takes a full batch of concrete from an 11-S mixer. Gravity dumping is instantaneous, or can be snub-line controlled.



2000-pound platform — Change from hopper body to platform, and you have a heavy-duty, 1-ton capacity truck for hauling concrete blocks, stone slabs, sacked cement and other bulky materials. Moto-Bug platform has a load area of 34 x 54 inches, and is equipped with stake pockets for sideboards. Platform tilts for unloading—has same gravity-dump principle as hopper body.

7-foot fork lift attachment lets you use the R-15 Moto-Bug for lifting, loading and unloading. It's readily interchangeable with hopper or platform — lifts 1500 pounds to 7-foot height. Hydraulic power raises and lowers load. Mast can be tilted back 10° when carrying load — or 2° forward for pick-up or releasing load. Forks are 24 to 30 inches long — adjustable 6 to 32 in. wide.



Mail to: KWIK-MIX COMPANY, Port Washington, Wis.
Send us literature on: ☐ R-15 Moto-Bug ☐ 5-15 Moto-Bug

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R-15 Moto-Bug is now equipped with automatic power-flow transmission. There is no shifting, no clutching. It travels at speeds up to 12 m.p.h. forward or reverse — climbs 25% ramps or grades with full 2000-pound load in hopper or on flatbed platform. It's powered by gas or optional diesel engine, has automotive-type brakes. There is 18-to-1 gear reduction on steering wheel. Turning radius is short, only 82 inches — overall width, 35 in. Check what its maneuverability, speed, power, and operating ease can mean on your jobs.

3-tool usefulness is available in 2 sizes of Moto-Bugs



S-10 Moto-Bug — For smaller jobs, Kwik-Mix also brings you 3-tool versatility in a 6 h.p. Moto-Bug. This S-10 model has 10 cu. ft. capacity as a power wheelbarrow — 1500-pound load capacity as flatbed truck — and 1000-pound (6-foot) fork lift attachment, all interchangeable. Operator rides on rear step — has safe, automatic "deadman" brake control. A small investment in Moto-Bug can earn big savings in time and labor on your work. Check on both sizes — see your Kwik-Mix distributor or write us.

Dig 6 feet wide with 310 Trenchliner®

Equipped with dual booms, big-capacity 310 Trenchliner digs 6-foot trench at depths to 12 feet. With single boom it has 1½ to 4½-foot widths, and 17-foot maximum depth. Digging speeds range from 5 inches to 20½ lineal feet per minute. Power-shift spoil conveyor discharges to either side of machine. There's full reverse of all operations for undercutting, making vertical set-ins. Parsons line also includes 4 smaller heavy-duty trenchers.

PARSONS • Newton, Iowa
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Lo-Bin® for batching or transit-mix

As a batch plant, Johnson Lo-Bin can be arranged with 2, 3 or 4 aggregate compartments. For transit-mix, one compartment can be used for bulk cement. It has 22 or 44 cu. ft. batcher, up to 4 weigh-beams. Batcher rides out beyond end of bin, dumps onto conveyor, or mixer skip (serves 6-S to 28-S mixers). Lo-Bin has 8, 20, 30-ton capacity, is only 7½ to 9½-ft. high — easily charged by tractor loader. Optional: wheels, tires, tow-bar.

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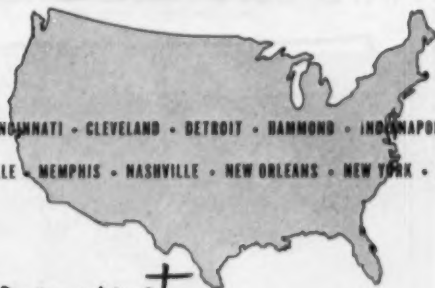
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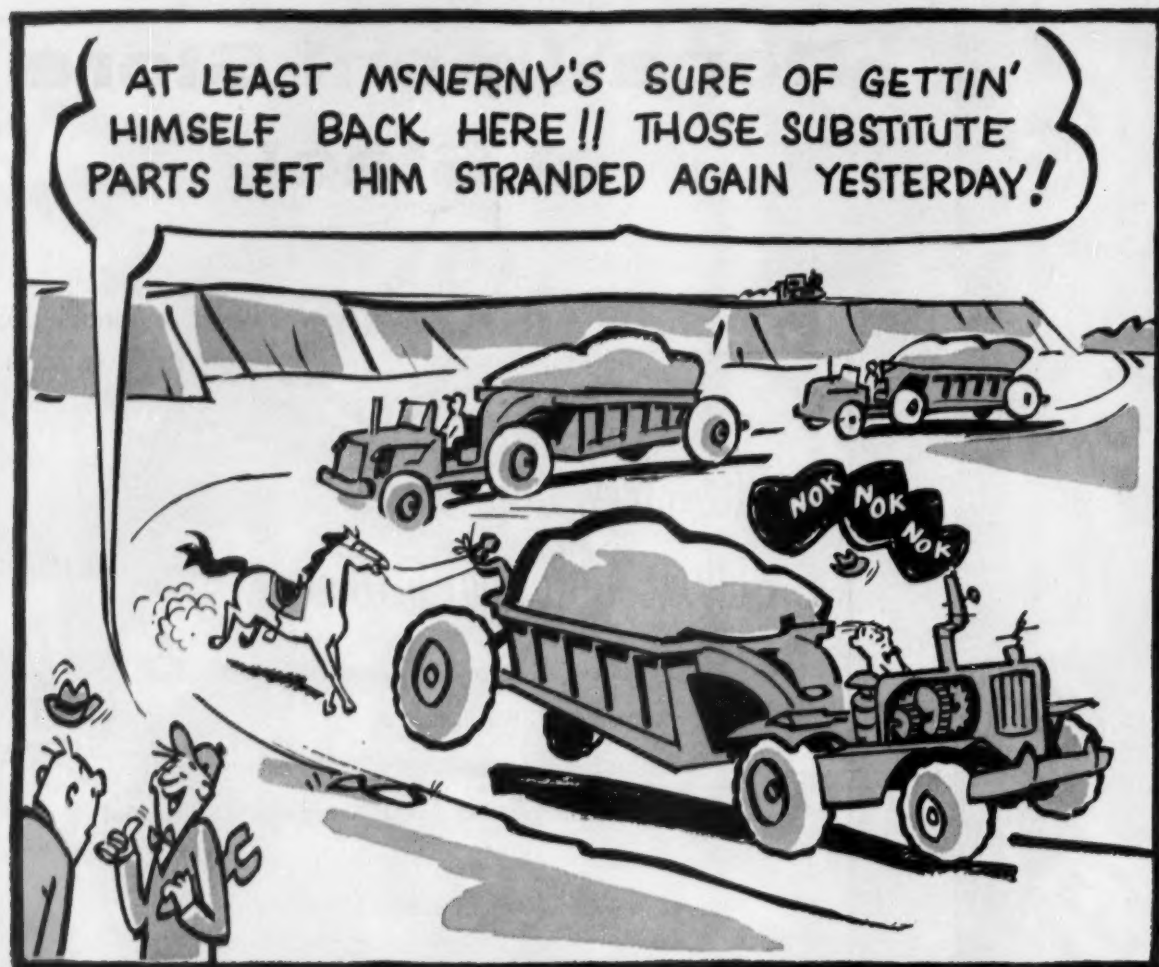
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for all Concrete Forms →

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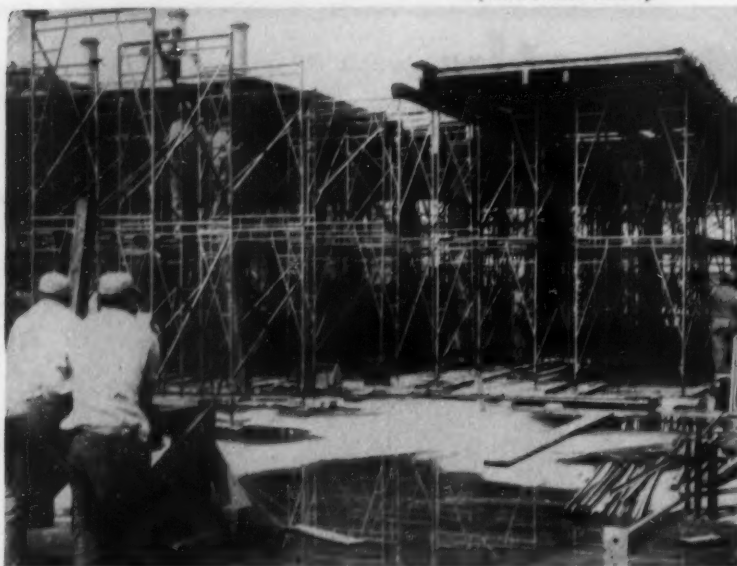
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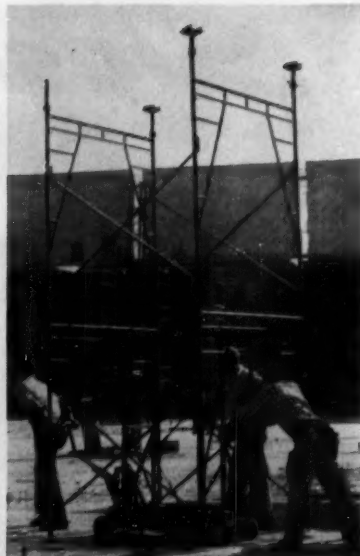
RUBARITE — New Powdered Rubber for Tomorrow's Asphalt Construction.

BORNE, SCRYMSER COMPANY

ELIZABETH, N. J. • CHARLOTTE, N. C.



THIS UNIQUE SYSTEM of moving complete sections of shoring to new pour areas is used by Wigton-Abbott Corp., Plainfield, N. J., to eliminate the job of disassembling and reassembling the shoring. Eleven "Trouble Saver" Sectional Shoring units, each covering 720 sq. ft., are pulled on wood sills by a hand winch. Each unit was slid three times for succeeding concrete pours during construction of the 189' x 231' Monsanto Chemical Co. warehouse, Kearney, N. J. Form work was "permanently" placed on those sections between drop heads.



WHEELED HYDRAULIC dolly is used to move four-frame unit of "Trouble Saver" Shoring to next pour. This system speeds operation for William J. Moran Co. on Emporium-Capwell Co. warehouse covering a city block in Oakland, California. 3,600 frames were used on this building.

Good Planning Cuts Shoring Costs

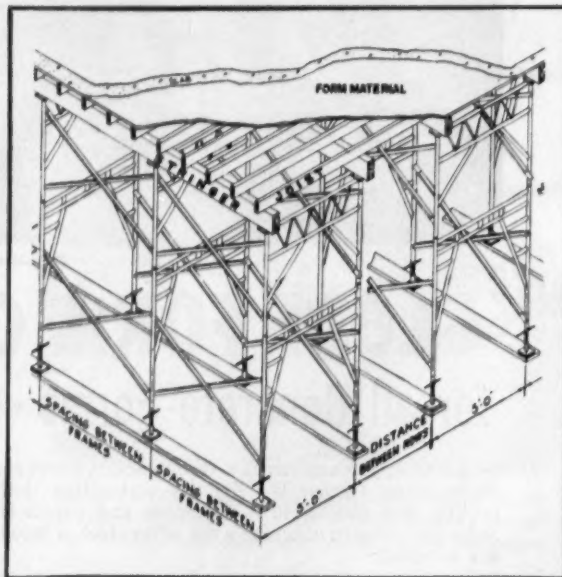
ONE OF THE MOST IMPORTANT advantages of modern sectional steel shoring is the fact that it can be planned on the drawing board. Load bearing strength can be accurately calculated, the number of units pre-determined and the whole installation laid out to assure greatest efficiency on the job.

It is during this planning period that the engineering ability, experience and imagination of The Patent Scaffolding Co. Inc., pays dividends to the contractor. For when a shoring installation is properly laid out on the drawing board, a lot of time, money and trouble are saved on the job.

First, PS Co. helps the contractor select the right kind of shoring by carefully studying the character of the job. Contractors planning with PS Co. have a choice of three types of steel shoring: "Trouble Saver"® Sectional, "TubeLox"® tube and coupler type Shoring and Burton's single post Shores. Once selected, the shoring is laid out to carry the desired loads with an adequate factor of safety and also to get maximum re-use from the number of units needed. Unique methods of rolling, sliding and lifting entire sections of sectional shoring from one pour area to another are often worked out at this stage too.

The complete story on PS Co. Shoring can be found in Bulletin PSS-33 "Modern Shoring for Concrete Construction". It's available at no obligation from the Patent Scaffolding Co., Inc.

To help you with your scaffolding and concrete shoring methods, PS offers a complete nation-wide engineering service available to you locally. See the Yellow Pages in your 'phone directory for the nearest Patent Scaffolding office or representative that sells and rents "Gold Medal" Scaffolds.



SAFE WORKING LOADS for "Trouble Saver" Sectional Steel Shoring vary according to spacing between 5'-wide frames, distance between rows, and position of stringers on frames. This prefabricated, engineered shoring will handle the heaviest loads and provides a clean, neat installation. It is easily adaptable to all types of construction: flat slab, slab with drop head, pan joist, poured arch and beam.

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ON THE ROAD—A single diesel truck tractor is sufficient to haul the 135-ton batch plant on an end run around the dam to its new

site. Topheaviness of the 95-ft-high structure might have been a problem in a strong wind, but it was calm moving day.

Batch Plant Takes a Trip

MOVING a topheavy concrete batch plant as tall as a seven-story building and with a base area only 24 ft square sounds like a delicate operation. But William Reese Construction Co. of Thief River Falls, Minn., hauled the 135-ton plant 2.1 mi in less than six hours without a hitch.

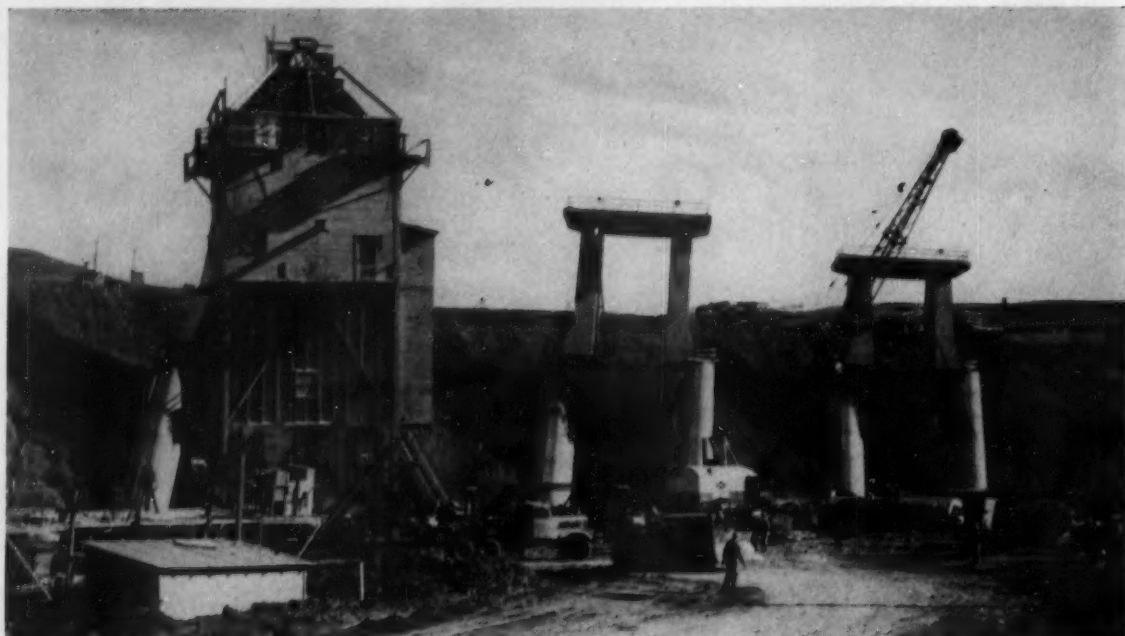
The move took place at Oahe Dam on the Missouri River near Pierre, S.D. In its original location the plant mixed 104,000 yd of concrete for the upstream half of the six outlet works tunnels. In its new location it will prepare 125,000 yd for the downstream half of the tunnels and the control shafts.

The Reese firm is a specialist at moving structures. This is only the second batch plant it has handled, but it has moved a total of 140 grain elevators. Reese did the job under a subcontract for Oahe Constructors, a joint venture that holds three Oahe contracts totaling nearly \$20 million.

George Lindquist, project manager for Oahe Constructors, said



ADVANCE PREPARATIONS—Base of plant is braced with 24 steel beams, then 50-ton jacks and track jacks raise the structure onto multi-wheeled dollies for the 2.1-mile haul.



READY TO GO—Cat D8 maneuvers into position to help diesel truck tractor haul plant up steep grade onto the haul road. In the background are some of the completed upstream outlet works tunnels for which plant mixed 104,000 cu yd of concrete.

the move saved four weeks downtime in an area where the construction season is all too short anyway. He estimated that it would have taken at least four weeks to disassemble, match-mark, and reassemble the plant.

The move was surprisingly easy. The aggregate bins were emptied to lower the center of gravity. Then Reese tied twelve 65-lb WF beams 60 ft long to the bases and placed twelve 65-lb WF beams 30 ft long as cross struts. The plant was raised by 50-ton jacks and track jacks. Multi-wheeled dollies were placed under the struts.

A single diesel tractor unit made the haul. It needed help from two Caterpillar D8's only at the one steep grade encountered. This was coming out of the "Hole" at the old location and onto a haul road around the end of the dam. The new location is 55 ft higher than the old, but the haul road runs at a constant elevation.

Members of the Oahe Constructors combine are Foley Brothers, Inc., St. Paul, Minn., Winston Bros. Co., Minneapolis, Minn., C. F. Lytle Co., Sioux City, Iowa, Donovan Construction Co., St. Paul, and Missouri Valley Constructors, Inc., Leavenworth, Kans. Oahe Dam is a Corps of Engineers project. Col. Thomas J. Hayes is Omaha District Engineer, and John W. Sibert, Jr., is area engineer.



THE START—Toughest part of the move was the first few yards up onto the haul road. New plant site is 55 ft above the old site, but this was the only steep grade.



"Trojan H-2 Multi-Purpose Grease Lasts 25% Longer Than Any Used Before!"

Around Council Bluffs, when there's earth to be moved, Dofner's the man. Excavating for roads, house, or building construction, he keeps his 21 dump trucks and other equipment in constant operation to fulfill his heavy job schedule.

But you'd never know this by the amount of gasoline or lubrication required. "The fact is," says Dofner, "I've found Cities Service Trojan H-2 Multi-Purpose Grease lasts 25% longer than any other grease I've ever used. And my dump trucks are actually running an average of 10 hours apiece and getting as high as 20 loads on one tankful of Cities Service Gasolene. Needless to say, I'm sold on Cities Service!"

Again and again, Cities Service receives reports such as this from construction men. If you'd like to know the reasons why, talk with a Cities Service Lubrication Engineer. Or write Cities Service Oil Company, Sixty Wall Tower, New York 5, N. Y.



MORE OF DOFNER'S EQUIPMENT AT WORK. Although he keeps it in almost constant operation, Dofner reports he's never lost a bearing and goes 25% longer between greasings since he switched to Trojan H-2 Multi-Purpose Grease.

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Dealer or distributor franchise may be available in your area.

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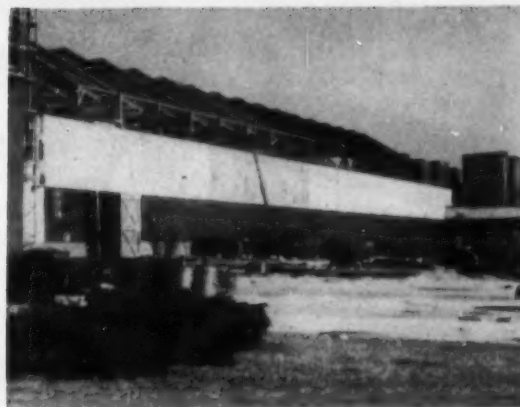


DUAL-CHAMBER TANK handles two batches alternately. Mixing blades are powered by Wisconsin engine. Meter controls water.



NOZZLE sprays concrete around reinforcing bars, leaving no sand pockets. Air is sometimes added at the nozzle to boost adhesion.

Sky Hooks Help Raise Factory Roof



INCREASING INTERIOR head space of old factory by 11 ft requires hanging roof from outside and removing connecting chord of supporting arch.

BY SUSPENDING the timber-arched, roof of a factory building from an external framework, a New York contractor was able to remove the roof's interior structural support and get additional headroom. Using a sky hook method of suspension made the job possible. Using high strength bolts for connections cut steel erection costs \$7 per ton.

Republic Aviation Corp. of Farmingdale, Long Island, recently bought a 13-yr-old, 400,000 sq ft factory building from a neighboring aircraft firm to use for engineering research and small-scale assembly. Unfortunately, laminated timber arched trusses spaced 20 ft

apart supported the roof of the old building. More unfortunate were wood lower chords that joined the truss ends. Presence of the chords reduced workable headroom within the building to 16 ft. Without them, headroom would amount to 27 ft. Republic needed the additional 11 ft and was determined to get it. But removing the chords would cause the roof to collapse.

Gaining the space meant doing one of two things; (1) Removing and replacing the old roof entirely (expensive way); (2) Finding a way to remove the chords yet support the roof (inexpensive way). The inexpensive way was decided on: Remove the obtrusive chords

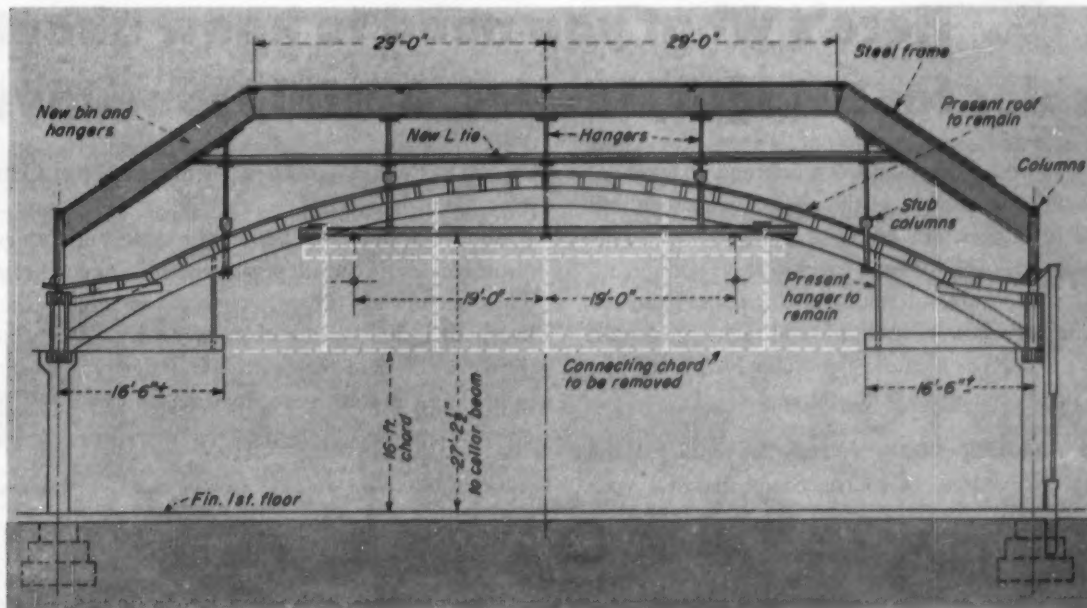
and resupport the roof. One problem remained: How to do it.

"A perfect job for a sky hook," one official quipped.

The sky-hook idea wasn't far wrong. Republic decided to erect a rigid-frame steel structure over the arched roof, suspend the bowed trusses to the frame in sky-hook fashion, remove the chords, and thus gain the desired headroom.

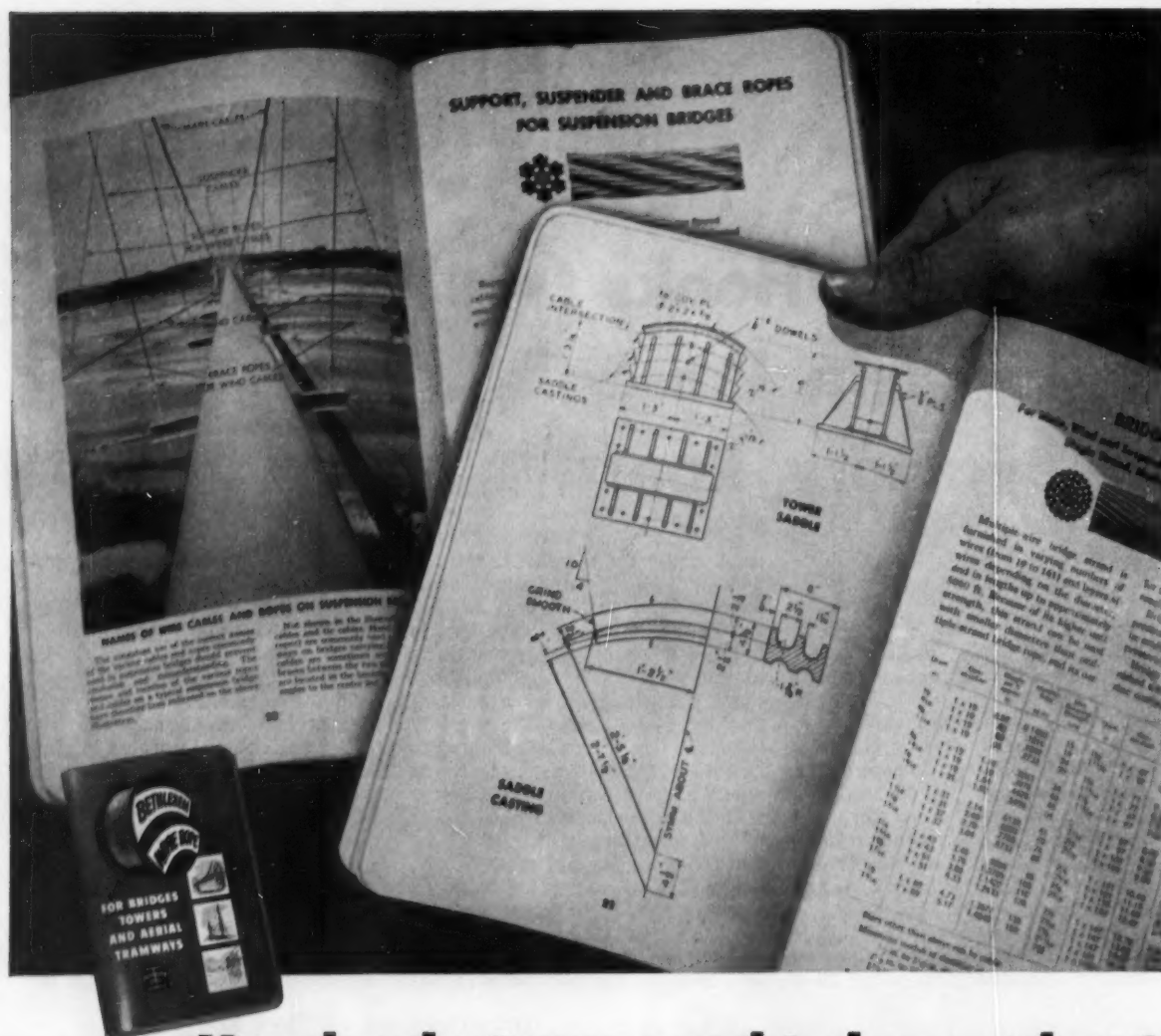
Republic turned execution of the plan over to Fischer-Malik Corp., Long Island general contractor. Fischer-Malik's steel erector was the White Plains Iron Works.

Work began on the building's
(Continued on page 90)



ERECTING HANGING system begins with placing of vertical steel columns over roof spandrel beams of building. Steel frames are

erected on columns to hold hangers that cut through roof and support arch trusses. This permits removal of connecting chords.



Here's what you need to know about Cables for Bridges, Towers, Aerial Tramways

Bethlehem has just published a new and comprehensive handbook devoted to the uses of wire rope and strand in bridges, towers, aerial tramways, etc. This 160-page book is filled from cover to cover with practical information and interesting photographs. There are also drawings showing structural and anchorage details, and various types of sockets and clips. All in all, the book has more than 200 illustrations.

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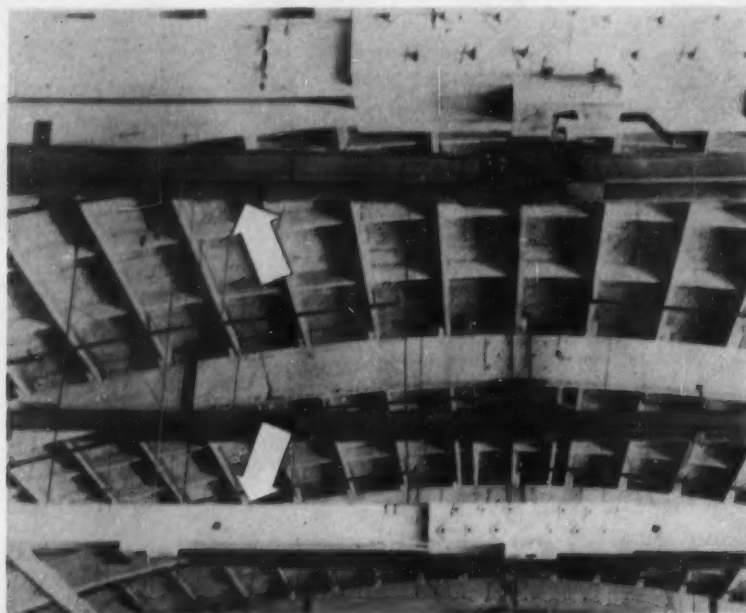
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SKY HOOKS . . . Continued from page 87

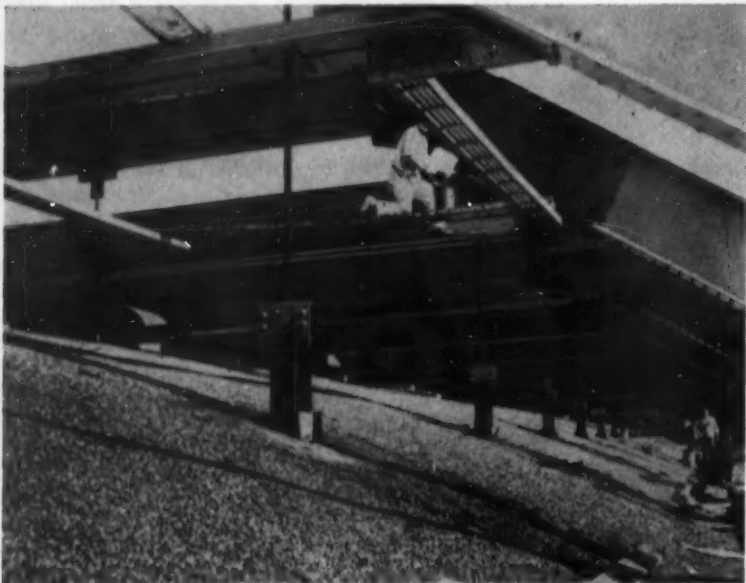
spandrel beam, which was supported by concrete columns spaced 40 ft on centers. The spandrel was a continuous laminated 2½x6-ft beam which ran the perimeter of the building. The contractor first cut through the building's roof, laying the top of the beam bare.

Workmen then bolted 6-ft-long steel columns vertical to the span-

drel 20 ft on centers. These were to support the frame, which in turn would support the roof. Next, lengths of 36-in. WF 170-lb beams, raking up and inward at a 45-deg angle, were bolted to the tops of the columns. Each raker beam was connected to its opposite number across the building by 56-ft lengths of equal weight beams.



STEEL RODS RUN through factory roof and connect to supporting channels which are fitted to each side of arch truss underneath. Rods are designed to support 200 kips.



STUB COLUMNS POKE through roof and are secured to structural steel frame erected on outside of building. Intermediate angles help support hanger rods.

Pairs of continuous angle ties back-to-back were bolted to the upper 1/3 point of each raker beam, furnishing additional support. Diagonal beams at 45-deg angles connected adjacent columns to prevent lateral movement. Seventeen of these units, each designed to support 200 kips, completed the framing portion. Construction then moved to the inside of the building.

To transfer the existing roof load to the new frame, workmen placed steel channels back to back on each side of the arched wood truss. Steel plates secured the channels to each other and served as seats for the arched truss. Connecting the truss-supporting channels to the outside steel frame followed. This step would remove the need for the truss's connecting chords.

To do this, workmen punched a hole through the roof over the truss near the ends of the channel seats. They dropped a stub column through each hole and bolted the column's bottom end to the steel channels. To the upper end of each stub column, workmen secured a length of 1¾-in. steel hanger rod which connected, at its upper end, to the new frame's wide flange beam that crossed over the roof. A third hanger rod was secured without a stub column at the center of the beam, which extended down and tied into the carrying channels. Two additional rods were placed at the exterior ends of each beam.

Once all trusses had been supported, workmen cut away the connecting chord to transfer roof support to the external steel frame. This step completed the job.

All connections were made with high-strength bolts. White Plain's reason for using them was because they have a 20% higher fatigue strength than rivets. But in using bolts on this relatively small job, steel erectors achieved erection savings of \$7 per ton. Savings came because only a two-man crew was needed for placing the connections. Rivets would have required at least four men. Cost of the additional men on an extensive rivet job could be written off over the course of production; but on a small job, using two men proved a real economy, despite the fact that the initial cost of bolts was higher.

Fischer-Malik's superintendent was Phil Johnson. Carl Remy was project manager.



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distributor today.

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WORTHINGTON



IF IT'S A CONSTRUCTION JOB, IT'S A **BLUE BRUTE** JOB

Contractors' Tools • Wagon Drills • Rotary Compressors



EARTHFILL DAM will plug this gap in the path of the north fork of Stanislaus River in California before the end of this construction season. A total of 3,330,000 cu yd of fill for the dam must be hauled from borrow areas about a mile upstream.

Dirt Flies at Beardsley Dam

CONSTRUCTION forces are working under a full head of steam in California's Sierra Nevada to place 3,330,000 cu yd of fill in Beardsley Dam this summer. They are geared to lay down 20,000 yd of fill in a two-shift working day.

This is a hurry-up, one-season job for plenty of good reasons. One is that there's a bonus clause for early completion. Another is that finishing the fill this summer will permit water storage next winter and earlier operation of the project.

On the negative side, failure to wind up this summer would tie up a lot of expensive equipment over the winter. And it would involve some risk, too; the diversion tunnel can handle summer flows, but

trouble might develop when winter and spring floods come along.

Contractor on the job is a joint venture called Tri-Dam Constructors headed by Morrison-Knudsen Co., Inc., and including Peter Kiewit Sons' Co., Macco Corp., and Stolte, Inc.

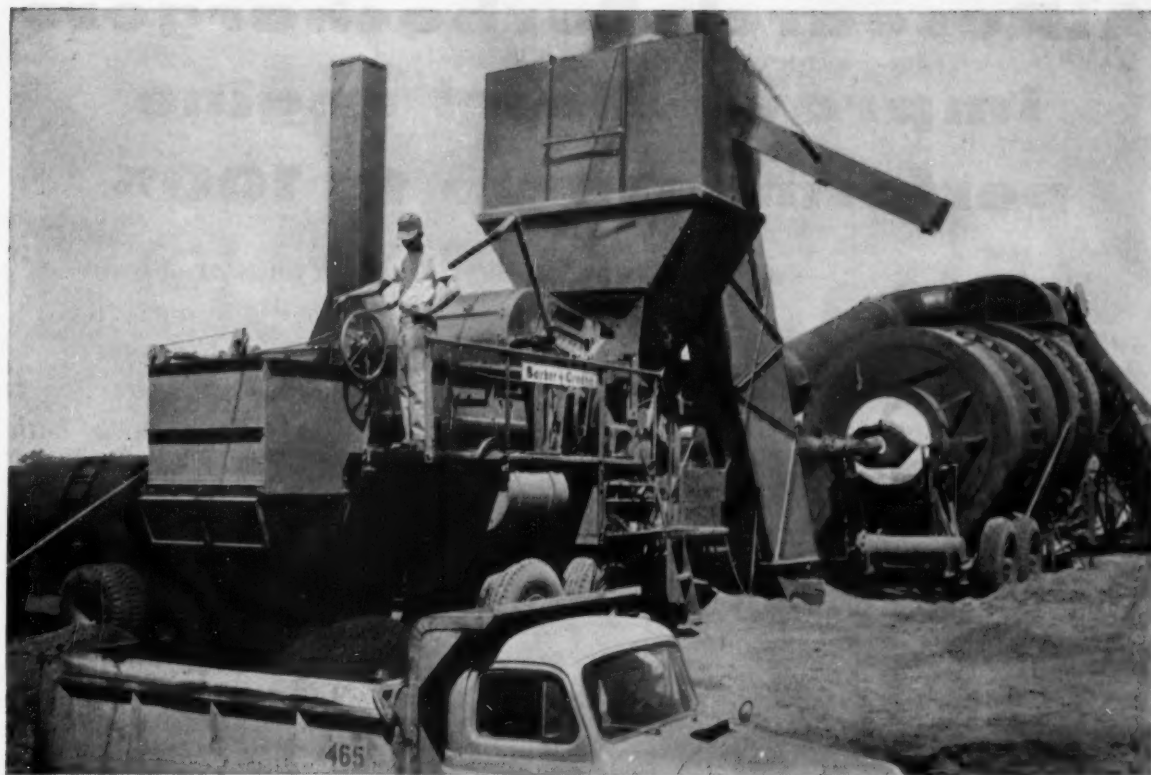
Beardsley Dam will rise 280 ft above stream bed and will have a maximum height of 320 ft. Length of the fill is 800 ft, and maximum thickness at stream bed is 1,200 ft. Contract also calls for construction of a small powerhouse just downstream and a rock and timber crib afterbay dam. The spillway will be on a right bank rock shoulder.

Borrow pits for both the im-

pervious fill and the miscellaneous fill are within the reservoir area. Length of haul is only about 1 mi. Rock blanket material will come from the spillway excavation.

Equipment

A Euclid loader hauled by a Caterpillar D9 tractor supplies impervious fill to six 17-yd Euclid belly-dump trucks. A Manitowoc 4500 shovel with a 5½-yd dipper loads miscellaneous fill on 14 Euclid and 4 Dart end-dump trucks rated at 17-yd capacity. Actually the Dart trucks have been handling a little more than rated capacity. Although the hauling units are assigned either to impervious or miscellaneous fill, they may be shifted



48 hours after this picture was taken, this asphalt plant was operating 70 miles away

In its first season of operation, this Barber-Greene Model 848 continuous plant was moved to six different job sites . . . produced 111,315 tons of quality hot mix in 555 hours of operation for an average of 200 tons per hour.

All plant components are mounted on rubber-tired chassis for over-the-road towing at truck speeds.

Gradation Control Unit Added

Typical of the many Barber-Greene plant owners, this Minnesota contractor operated with the basic equipment first and later purchased the Gradation Control Unit. He can meet any specification, and has the flexibility of towing the Gradation Unit only to those jobs requiring screening after drying.

Inherently Automatic

Plant operation is based on the Barber-Greene continuous principle which is inherently automatic. Once the

controls are set, the plant produces at top efficiency and accuracy.

Barber-Greene manufactures a complete line of continuous and batch asphalt mixing plants with capacity ranges to meet your production requirements.



Same continuous plant with Gradation Control Unit added.

Write for literature on any continuous or batch plant in Barber-Greene's complete line.

56-2-A



Barber-Greene

AURORA, ILLINOIS, U.S.A.

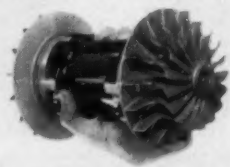
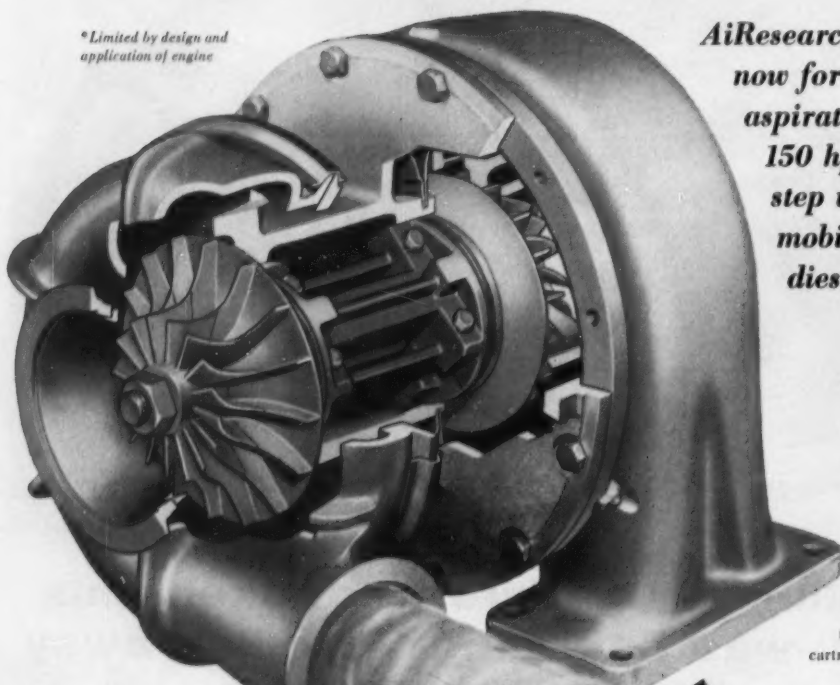


CONVEYORS...LOADERS...DITCHERS...ASPHALT PAVING EQUIPMENT

AiResearch Turbochargers improve diesel engine performance up to 100%*

* Limited by design and application of engine

AiResearch units are available now for use with normally aspirated diesel engines of 150 hp and up. They step up performance of both mobile and stationary diesels, land or marine.

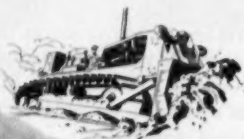


Removable cartridge simplifies repair and overhaul

This cartridge contains the turbocharger's rotating assembly, bearings and seals in a factory balanced package. It can be replaced in minutes with another factory balanced cartridge by a mechanic on the scene.

AiResearch has more experience in the design and manufacture of small turbomachinery than any other company. AiResearch turbochargers are the most efficient and safest units of their kind. New additions to the AiResearch family of turbochargers have widened their range of application in the diesel engine industry.

Our engineers welcome the opportunity to work with you in improving the performance of your diesel engines. We are happy to confer on applications of the turbocharger principle to your power plants.



AIRESEARCH TURBOCHARGERS NOW AVAILABLE

MODEL	T-10	T-15	T-16	T-30
Diameter — in. nom.	9	15¼	11½	15¼
Length — in.	9	16¾	13¾	17¼
Weight — lb.	39	125	100	135
Output — lb./min. (Standard Conditions)	25-40	35-65	45-65	70-95

THE GARRETT CORPORATION

AiResearch Industrial Division

9225 South Aviation Blvd., Los Angeles 45, California

DESIGNERS AND MANUFACTURERS OF TURBOCHARGERS AND RELATED MACHINERY

BEARDSLEY DAM . . . Continued



SHOVEL loads sand and gravel shell material into a fleet of 14 Euclid and 4 Dart end-dump trucks rated at 17 cu yd capacity.

Shovel is a Manitowoc 4500 mounting a $5\frac{1}{2}$ -cu-yd dipper. Contractor is placing 20,000 cu yd of fill in a two-shift day.



ELEVATING LOADER keeps six 17-cu-yd Euclid belly-dump wagons busy hauling impervious fill. The loader, also a Euclid, is pulled by a single Caterpillar D9 tractor.

from one to the other whenever necessary.

To supplement the compaction obtained through the truck operations, the contractor has two 50-ton rubber-tired Ferguson rollers. One of these rollers is pulled by a Cat DW20 rubber-tired tractor; the other by a Cat D8. The rubber-tired tractor delivers better compaction, but the track-laying tractor is handier near the abutments.

Two or three Cat D8 tractors are on the fill at all times for spreading operations. One of them pulls a toothed unit to loosen the top rolled layer so that a better bond with the next lift can be obtained.

Beardsley Dam is one unit of the Tri-Dam Project, a joint development of the Oakdale Irrigation District and the South San Joaquin Irrigation District. The other two dams are Donnell's Dam—a concrete

The Engineer's Field Report

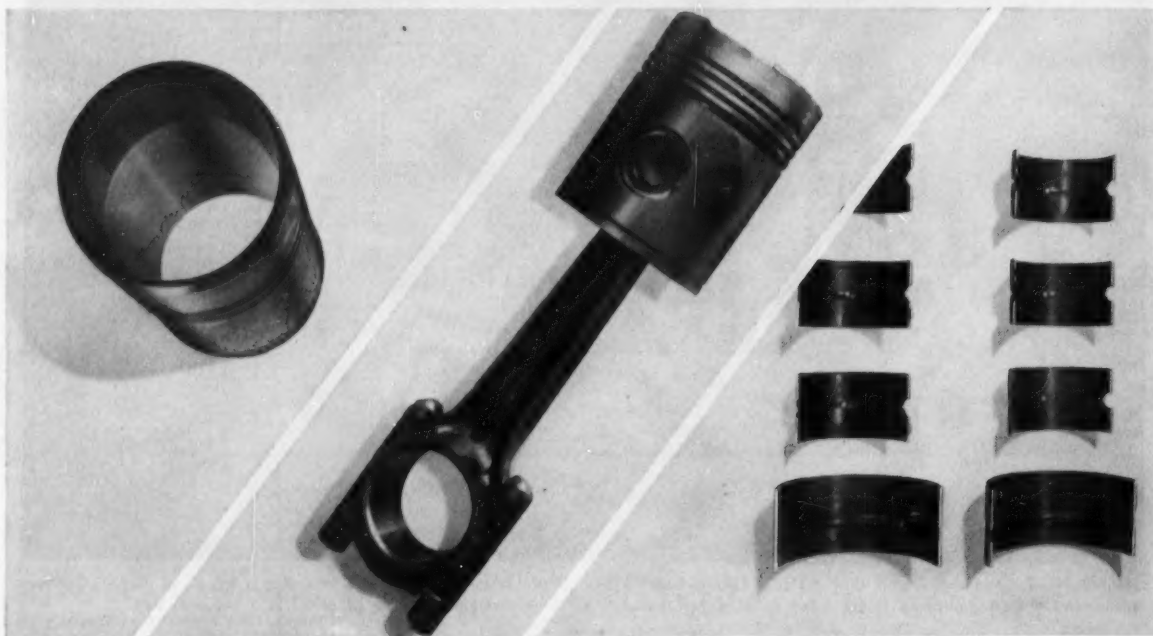
CASE HISTORY

RPM DeLo Oils

LUBRICANT

Progressive Transportation Co.,
FIRM Compton, California

RPM DELO holds piston wear to .001" after 201,253 miles of on-and-off highway hauling



LUBRICATED WITH RPM DELO Oil, these engine parts were pulled from a Cummins HR diesel after 201,253 miles. A portion of this mileage was put on during four months of rugged service spotting loads of heavy pipe in the Arizona desert. When the engine was taken down, after two years of this on- and off-highway hauling, Progressive Transportation Co. found RPM DELO Oil had kept lacquer, gum, sludge, and deposits from forming...rod bearing wear varied between .0005 and .001 inch and pistons showed maximum wear of only .001". No wear at all evident on

main bearings. Progressive Transportation uses RPM DELO Oils in all its large fleet of tractors—some of which have traveled well over 200,000 miles without overhaul.

Why RPM DELO Oils prolong engine life

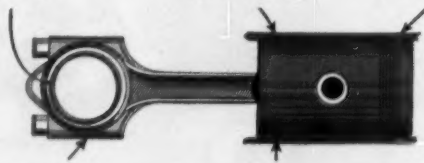
Special compounds stop corrosion

Anti-oxidant resists lacquer formation

Detergent keeps all parts clean



For More Information... about this or other petroleum products of any kind, or the name of your nearest distributor, write or call any of the companies below.



Metal-adhesion qualities keep oil on parts in running or idle engines—inhibitor resists foaming

STANDARD OIL COMPANY OF CALIFORNIA, San Francisco 20 • STANDARD OIL COMPANY OF TEXAS, El Paso
THE CALIFORNIA OIL COMPANY, Perth Amboy, New Jersey • THE CALIFORNIA COMPANY, Denver 1, Colorado

BEARDSLEY DAM . . . Continued



SPRINKLER TRUCK wets the fill while 50-ton Ferguson rubber-tired roller, pulled by a Cat D8, compacts it. Contractor has two Fergu-

son rollers on the job to supplement compaction from truck operations. Darker material right is impervious fill.

arch with a deep foundation—and Tulloch Dam—a 1,600-ft-long concrete gravity structure. The project includes Donnell's Tunnel—a 7.2-mi, 12½-ft horseshoe that leads to a powerplant served by a 2,600-ft, 81-in. dia steel penstock.

Tri-Dam Constructors holds a \$31.2 million contract to build both Beardsley and Donnell's Dams as well as the appropriate tunnels and powerhouses. Beardsley Dam is set at \$9.8 million of the total joint venture contract.

Heading up the contractor's forces at Beardsley Dam are O. H. Tucker, project manager, and B. L. Perkins, superintendent. Supervising the work for the two irrigation districts is Tudor-Goodenough Engineers with B. W. Goodenough as project engineer. S. R. Overholser is assistant project engineer, and A. H. Griffin is resident engineer.



TRUCK compacts fill near rocky face of dam abutment. Dumpster unit is well-suited for this job because of its good driver visibility and equal speeds in both directions.

(Advertisement)

Power-Dome more than a name

... proves real gas saver, reduces upkeep, too ...

How Chrysler Engineering Cuts Truck Operating Costs



by
**Jim
Byers**

When a new truck engine that promises more MPG and lower upkeep comes along, that's *news*.

But, naturally enough, fleet operators prefer not to go overboard in their praise of such new developments until they've proved them in actual operation.

That's the story of Chrysler Corporation's radically different Power-Dome V-8 combustion chamber, introduced in the 1954 Dodge C-1 series.

From the start, fleet men were agreed it looked great "on paper"; but had to wait for a *factual* answer to the all-important question, "Will Power-Dome actually increase gas mileage, actually reduce maintenance costs?"

The answer to that question, after well over two years of service in fleets of all types the country over, seems to be an unqualified "Yes".

Owners of Series C-1, and the current C-3 Dodge V-8 trucks report remarkable gas savings and unusually low maintenance costs. They say they not only get more MPG (on regular fuel), but find engines maintain power and efficiency far longer than those of standard design.

In layman's language, here is how Chrysler engineers were able to give Dodge short-stroke V-8's these cost-cutting characteristics:

First, let's study the diagram below.

You'll notice, among other things, that the standard, wedge-shaped combustion chamber (Fig. 1) has corners where carbon can easily collect, whereas the Dodge Power-Dome chamber (Fig. 2) eliminates such power-stealing carbon hot spots.

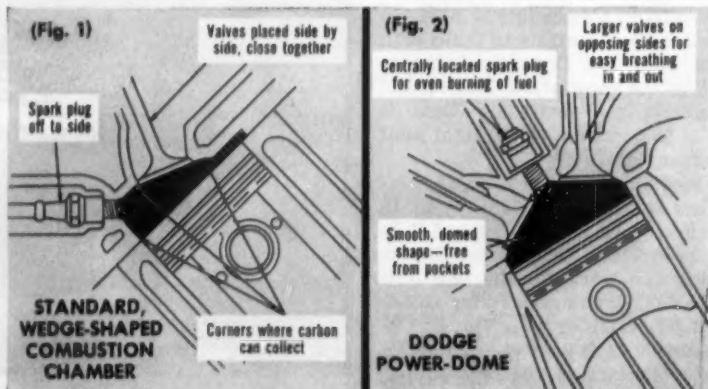
Next, notice the spark-plug location. In the Power-Dome design, it is centrally located, instead of off to one side. Flame travel, therefore, is uniform to all parts of the chamber; thus the fuel mixture is burned faster, more evenly, and more completely.

Valve placement, too, is unusual. In the Dodge Chrysler-engineered power plant, intake

and exhaust valves are located on opposing sides. This permits use of larger valves for easier engine breathing, elimination of fuel waste.

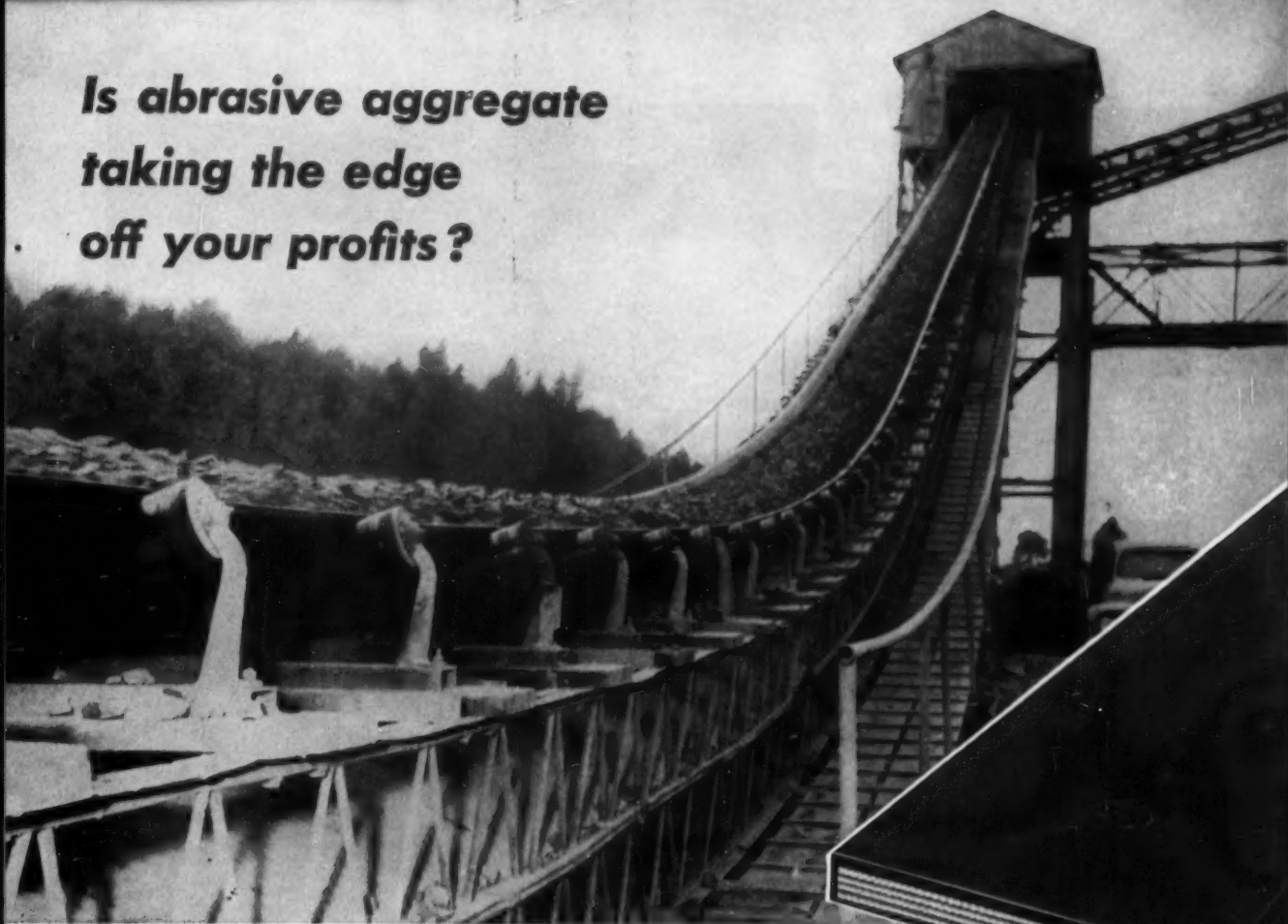
In addition to Power-Dome, Chrysler engineers have incorporated other features in Dodge truck engines that contribute to their unusual operating economy. Among a number of such advancements not found in most competitive makes are floating oil intake, ceramic fuel filter, positive exhaust valve rotators and dual exhaust system as standard equipment.

In fact, Chrysler engineers have made "fleet economy" their theme throughout the designing of today's Dodge Job-Rated Trucks. The result is a full line of trucks any cost-conscious fleet operator would be wise to investigate before investing in a replacement or adding to his fleet.



An advertisement for DODGE TRUCKS—the make with the Forward Look

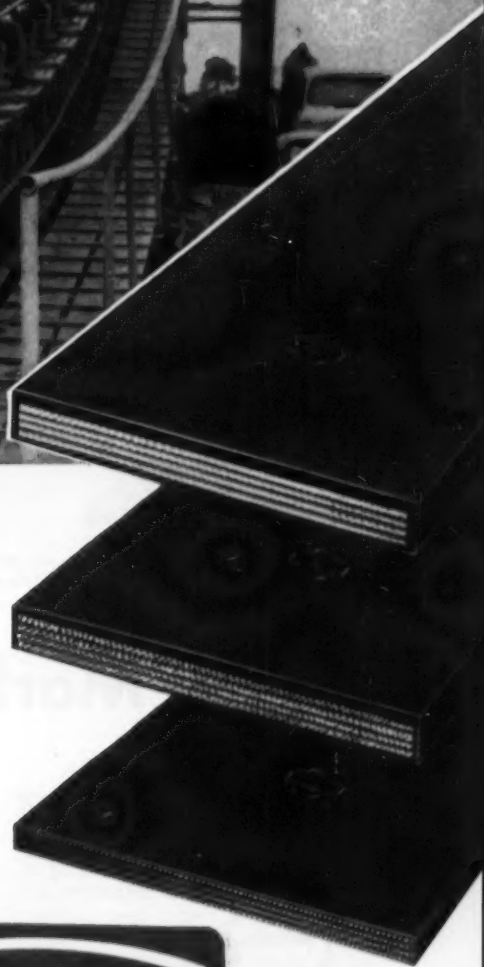
**Is abrasive aggregate
taking the edge
off your profits?**



Switch to Thermoid Conveyor Belting!

Sandstone, limestone, quartz rock and other abrasive materials make short work of conveyor belting that's not engineered for the job. You can avoid unnecessary downtime and belt replacement with properly selected Thermoid Conveyor Belting.

There's a Thermoid Belt for every type of handling—in long, continuous plant operation or portable equipment work. And because they're specifically designed for the job, Thermoid Belts last longer—save you money!

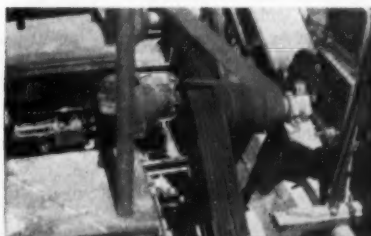


Thermoid

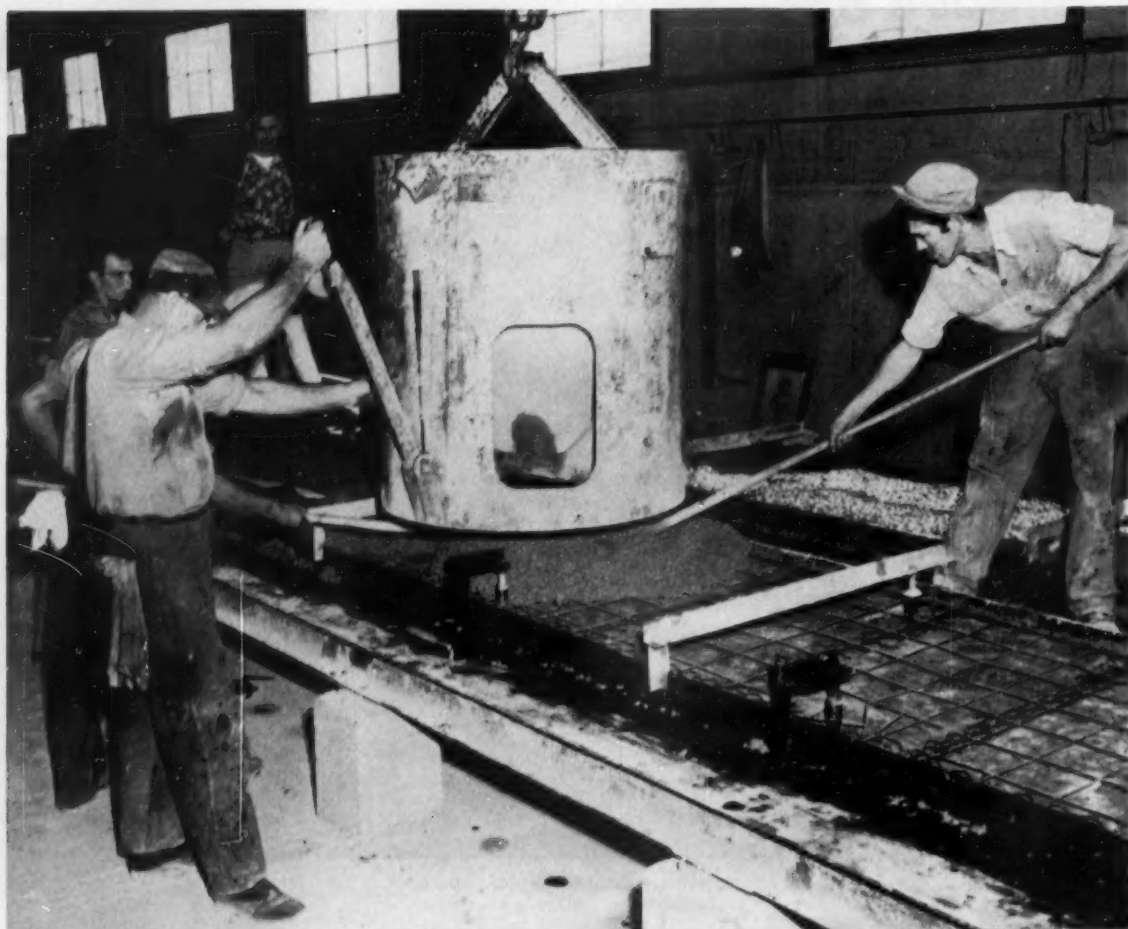
Thermoid Company,
Trenton, N. J.,
Nephi, Utah

**Make Thermoid your choice,
too, for Multi-V Belts.**

**... and Hose manufactured
with your needs in mind.**



Your Thermoid Distributor
can help you select the
right Hose, Conveyor Belt-
ing and Multi-V Belts to
lower your operating costs.



BUCKET dumps final layer of concrete over reinforcing set in panel. mesh reinforcing, then a sheet of fiberglass insulating panel, and finally the placing of more concrete and reinforcing.

Marble Chips Face Precast

CASTING marble-faced concrete sandwich panels for outside walls of the National Security Agency's 20 million Operations Building at Fort Meade, Md., is intricate, but it produces a cheap and durable stone substitute that can be erected for about 8¢ psf.

NSA's building is a 1,400,000-sq-ft reinforced concrete, three-story structure (CM&E, Oct., 1955, p. 124). Its exterior walls are precast panels 9½ in. thick. They consist of a 1-in. marble facing plus 1½-in. fiberglass insulation between two 1¾-in. layers of reinforced concrete. Panels average 6x20 ft.

The building is being erected by a joint venture of Tompkins-Jones (Charles H. Tompkins Co., Washington, and J. A. Jones Construc-

tion Co., Charlotte, N.C.). Marietta Concrete Corp. of Marietta, Ohio, and Earley Studios of Rosslyn, Va., are subcontractors for the casting and erection of the panels. The Marietta-Earley combine casts at a special plant near Baltimore and ships panels to the job by truck.

Casting

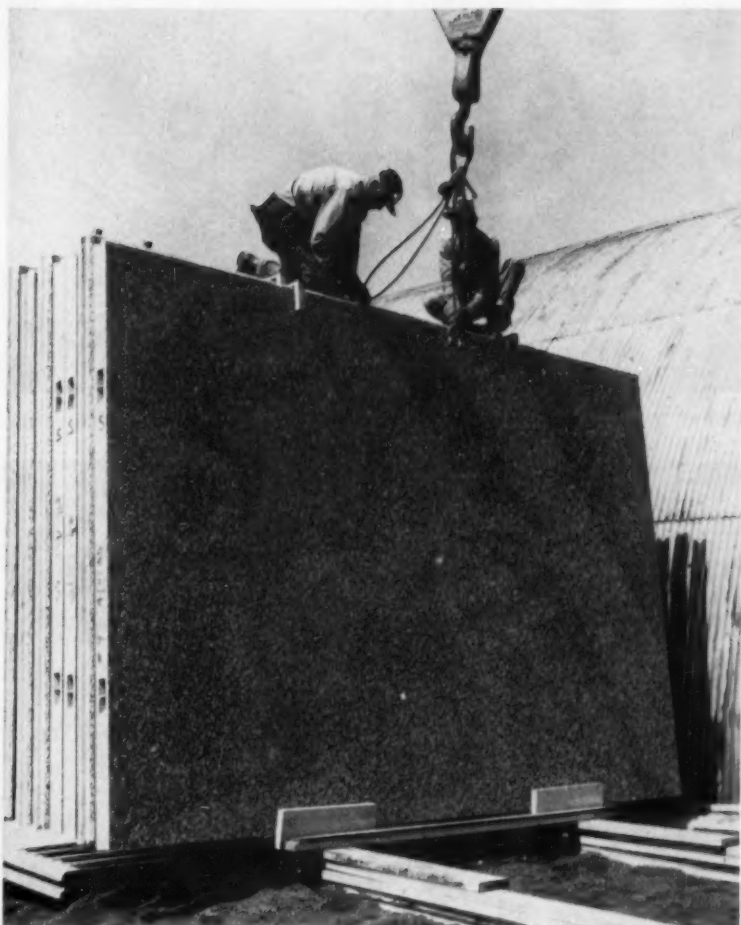
Casting begins with the erection of adjustable steel forms designed so that one end can be tilted up and the cast panel released and carried away by overhead crane. Forms are set on steel channels which rest on 2-ft-high concrete pedestals.

First to be cast is the marble facing. Marietta-Earley uses a high-slump mix containing No. 1

and 2-size Cardiff green and Royal green marble chips. Aggregates are weighed with cement and water to exact proportions and mixed in a tilter.

Because of its high slump, great care is taken in depositing the mixture. The tilter discharges it into wheelbarrows held close to the opening. Workmen then shovel the mix into the form and spread and tamper it with trowels to the required 1-in. thickness. The marble facing is allowed to set up for 30 min before pouring of backup concrete begins.

Pre-assembled reinforcing steel baskets, supported by a number of plated slab bolsters, are placed over the marble facing while 5,000-psi concrete is prepared in a mix-



POLISHING marble face brings pre-cast concrete panels to final brilliancy. Here workmen stack completed panels in manufacturer's yard prior to shipping them to job site.

the forms with saturated burlap and Sisalkraft paper. Each panel is cured for 15 to 20 hr in controlled 70-deg temperature.

Forms then are pivoted by a spreader beam suspended from an overhead crane hook. Once in a vertical position, the forms are held securely upright by a pair of hinged scissor braces. The panel is lifted from the forms by shifting the spreader beam to engage the four Tyscrus. Then two 3x4-in. oak spreader beams are held tight against the bottom edge of the panel with Tylags screwed into the bottom Tyscru helixes. This serves two purposes: the oak pieces furnish positive external support for the panel in case internal bond of the smooth lifting rods should fail; and they provide protection for the edge of the panel wherever it is set down.

The panel is carried this way to a special A-frame where it is cured for four days. Curing consists of playing a stream of water repeatedly on both sides. Strength gained by this method equals 48 hr of steam chamber curing.

Polishing

After the four-day curing period, the intricate process of bringing the marble face of the panel up to required texture begins. Workmen first rub down the face with electric sanding machines and wire brushes. Sanding removes surface films of cement which form in the mold. Wire brushing exposes the

Panels

er. A 1¾-in. layer of concrete is placed by bucket opened close to the facing. Workmen trowel the concrete level and set down a pre-cut 1½-in. sheet of fiberglass insulation.

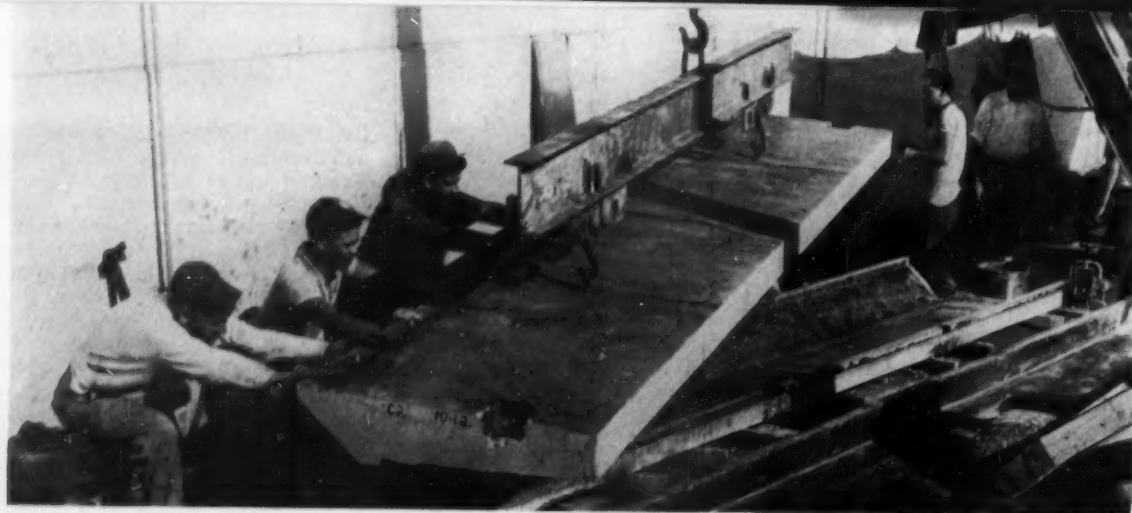
A second layer of reinforcing is placed along with four Richmond Tyscrus which run the entire width of the panel and later will be used for lifting. A second 1¾-in. layer of concrete then is placed. Workmen screed and float it level by hand. Cleveland pneumatic vibrators fastened to the underside of the steel form consolidate the layers of concrete and facing.

Initial Curing

Immediately after the completion of each cast, workmen cover



PANEL erection takes relatively short time. A single crew working with a crane can lift and set in place more than 2,500 sq ft daily. Panels average 120 sq ft. each.



WORKMEN guide odd-sized panel as crane lifts it from casting form. This panel will serve as parapet wall on building's roof.

MARBLE PANELS...

Continued

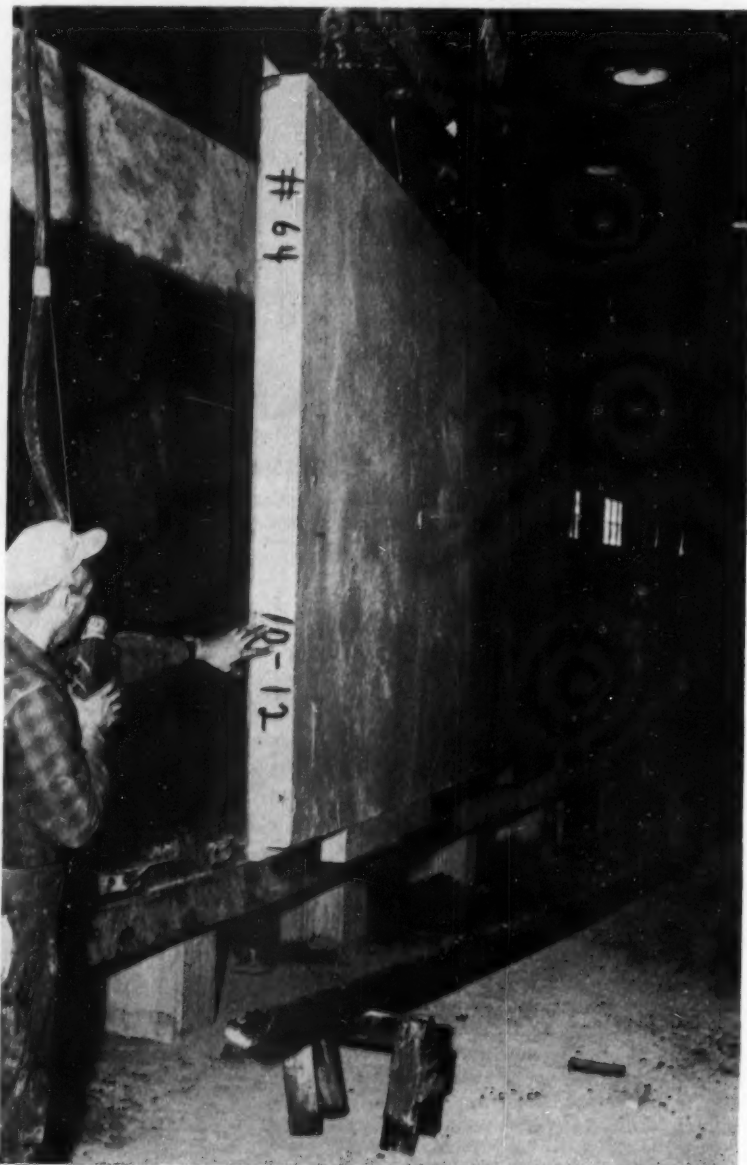
aggregates and brings them to a uniform texture.

Next step for the panel is an acid wash designed to bring out the facing's color and luster. The face is swabbed down with an aqueous solution of hydrochloric acid. This must be done rapidly to avoid washing away excessive amounts of matrix which would cause discoloration of the facing. There are only minutes to survey the work between the time acid is applied and then washed off with a water spray.

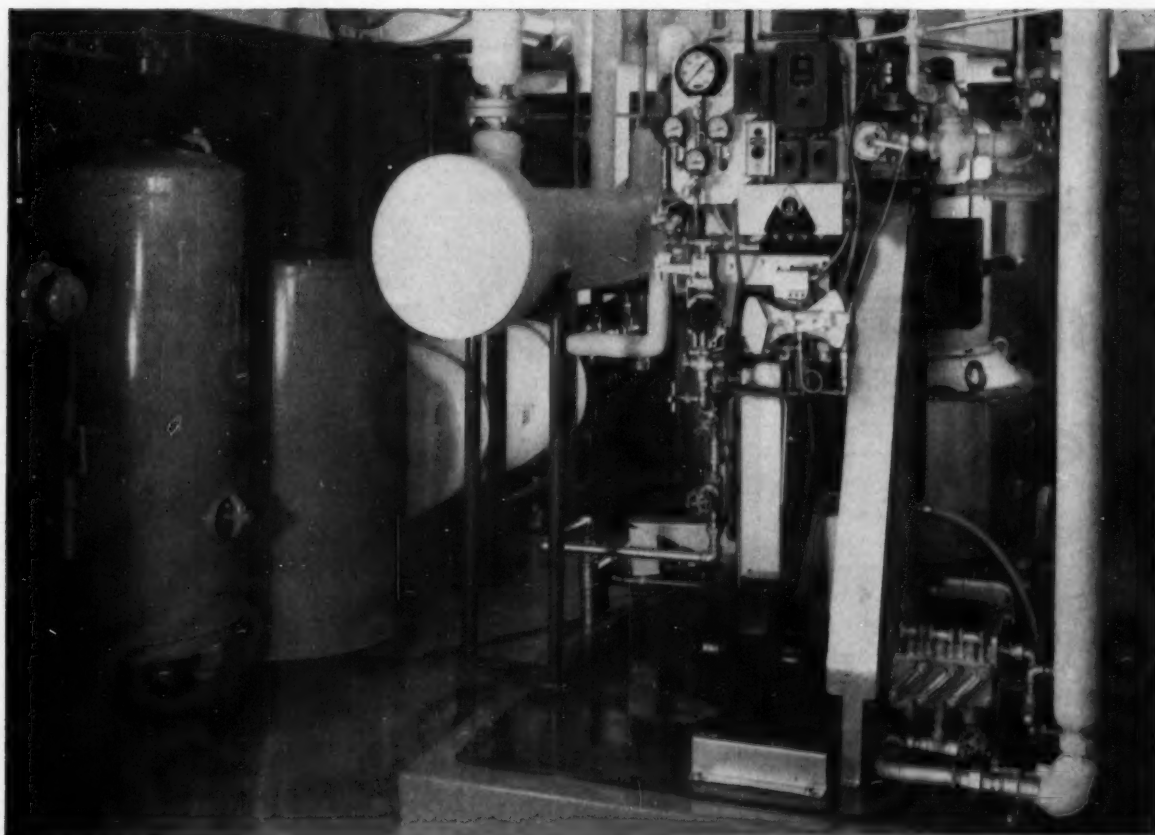
NSA specifications require three more weeks of curing before panels can be transported to the job and erected. Once again the overhead crane goes to work, picks up the polished panel, and carries it to the plant's yard. There it is stacked covered with sheets of muslin and kept wet for the required three weeks. At the end of that time the panel is shipped by trailer to the job site.

Erection is the simplest part of the job. Support angles are bolted to the face of the concrete columns to engage a pair of Peerless wedge inserts previously placed. A seven-man erection crew secures the angle supports several bays ahead while a mobile crane picks up panels and sets them directly into the wall. Erection takes about 10 min per panel. As typical panels measure 120 sq ft, erection costs come to about 8¢ psf.

Work at the base is under the supervision of Lt. Col. E. J. Ribbs, resident engineer, Baltimore District, U.S. Army Corps of Engineers. J. Slater Davidson is project manager for Tompkins-Jones; I. Alfred Dill is superintendent.



TRAVELING crane lifts completed panel after it has cured for short time in forms. Tilting form upward permits easy removal of panel before concrete has completely cured.



100 b.h.p. Modulatic at Fearn Food Products, Los Angeles.
Floor area, only 5' x 7'-3". Floor load, just 150 lbs./sq. ft.

For Fixed Installations...Relocation...Portability

MODULATIC STEAM GENERATOR

— world's most compact power-package

A job-to-job marvel—that's Modulatic. It makes steam wherever you need it!

Shipped fully assembled—just connect and fire up . . . equally easy to move. Passes through plant-type doorways. Takes no more room than a desk and chair. Can't waste fuel or water, because steam is made only "on demand" to maintain your pressure selection.

No expensive enclosure, foundation, stack—even works unprotected, outdoors. No early reporting or standby—delivers full steam in two minutes from cold starts. Operation is automatic.

Use Modulatic for pile-drivers and other power

needs . . . for temporary or year-round heat . . . for emergencies or conventional purposes . . . for permanent jobs or mobility—at the site or in the field. Used by over 10,000 (now 13,000) in service.

Eight sizes: 10 to 160 b.h.p. Pressures from 5 to 285 p.s.i. Oil, gas, or combination burner. Single or multiple units. *In Canada, write Vapor Car Heating Co. of Canada, Ltd., 65 Dalhousie Street, Montreal 3, Que.*

VAPOR HEATING CORPORATION

80 E. Jackson Blvd., Chicago 4, Ill., Dept. H-13

Please send me free 12-page Modulatic Booklet No. 586. I use steam for _____

Name _____

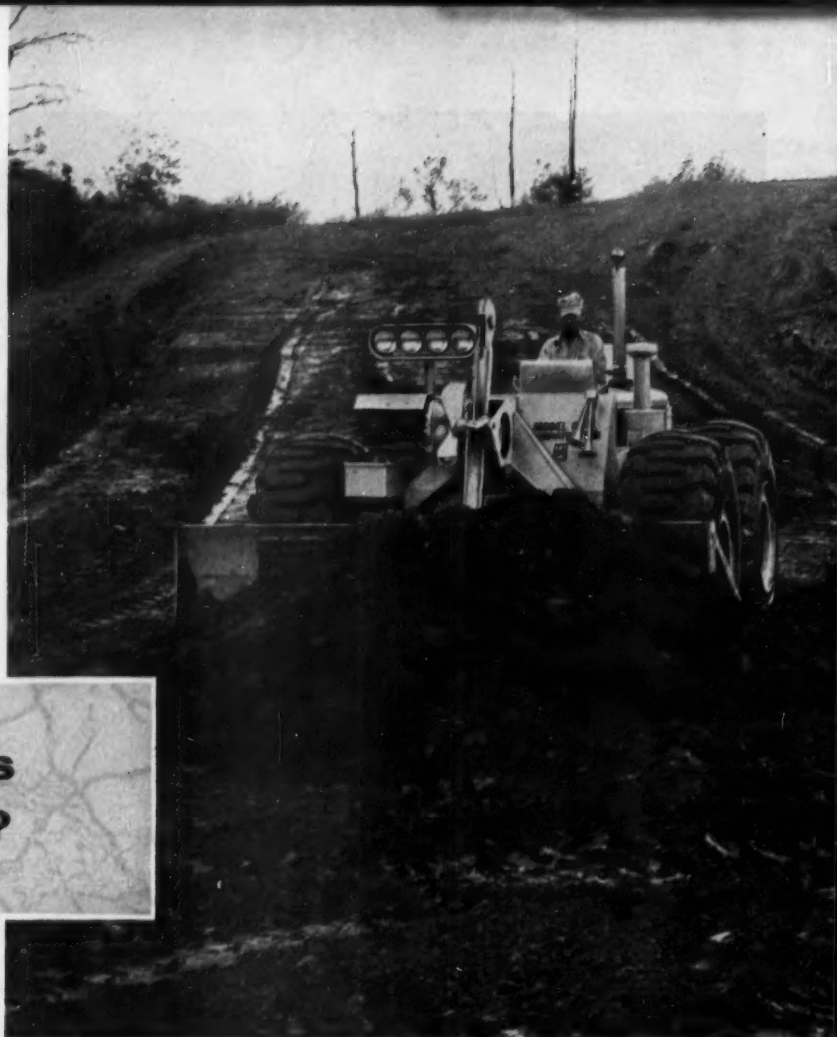
Company _____

City _____ Zone _____ State _____

50 years of steam generation and controls

**Is your
tractor
fleet
ready**

**for next year's
roadbuilding?**



You can't very well wait for the contract awards to plan your equipment spreads for next year's jobs. We both know that "time is of the essence" ... deliveries, now slow, will be even slower. We, at LeTourneau-Westinghouse, have been expanding our production facilities as fast as we can build and equip. Our orders tell us that many customers are already modernizing for the future with our equipment.

Isn't it time for you, too, to take a look at your equipment inventory?

Since the first units on the job are your tractors, perhaps that is a good place to start. Especially so, since study of the four dimensions of modern earthmoving ... 1 ... Power ... 2 ... Traction ... 3 ... Speed ... and ... 4 ... Mobility ... show that you have maximum opportunity to increase production and make cost savings by modernizing your traction fleet.

Why not have a list of your trac-

tors made to show, by machine ... age ... book value ... trade value ... power ... weight ... speeds ... type transmission ... torque converter ... range of economical self-powered moves? From this list you can plan a program of replacement and additions to improve your bidding position, your completion schedules, and your profit margins.

In making up your list of needed new equipment, study your recent big job experience to arrive at the desirable percentage for tractors on tracks with their advantage in low speed lugging, and the percentage for tractors on rubber with their big advantage in speed and mobility. Set up these rubber and track percentages separately for your pioneering, your fill, your pushing, and your finishing crew.

We believe that, at present, Tournatractor is the only job-proved candidate for your consideration in heavy duty rubber-tired tractors.

You have, no doubt, heard that competitive tractor manufacturers are designing and testing new, big, rubber-tired tractors. Some are conversions of crawler tractors with wheels instead of tracks. Some are new designs based on experience with small rubber-tired farm tractors. But only Tournatractor has 10 years of heavy duty field experience behind it and a long list of improvements based on this experience that make it a fully dependable, high-speed tractor ready for present-day earthmoving.

And, incidentally, when you hear stories of field troubles on Tournatractor operation, be sure you check for specific dates of the model and date of the trouble. Yes, we have had our troubles with Tournatractor ... but, with an active program of continuous improvement, our reports on present-day machines show that we now have a good serviceable tractor that can give operating efficiency and maintenance economy equal, or better,



How Federal Highway Spending Will Step Up

The following table from *Business Week* shows increase, by states, in Federal Aid over next three years. Note that the increase to 90% in

Federal participation on Interstate System Roads, will mean availability of additional state funds for use on the state and local highway system.

(Fiscal Years, Millions of Dollars)

STATE	1956	1957	1958	1959
Alabama	17.8	40.5	51.5	58.1
Arizona	10.6	23.6	29.7	33.4
Arkansas	12.9	29.3	37.3	42.1
California	47.1	110.9	142.6	161.2
Colorado	13.2	28.9	36.6	41.1
Connecticut	8.0	18.9	24.3	27.5
Delaware	4.0	10.9	14.2	16.3
Florida	14.5	33.6	42.9	48.4
Georgia	20.3	46.4	59.2	66.8
Idaho	8.7	20.1	25.5	28.8
Illinois	39.0	91.7	118.2	133.3
Indiana	21.0	48.2	61.7	69.6
Iowa	18.9	42.0	53.0	59.7
Kansas	17.8	38.4	48.2	54.2
Kentucky	15.7	36.7	47.1	53.2
Louisiana	13.8	32.3	41.6	46.9
Maine	6.7	15.5	20.1	22.6
Maryland	9.5	22.7	29.6	33.5
Massachusetts	16.3	39.9	52.1	59.0
Michigan	30.0	70.5	90.4	101.9
Minnesota	20.7	46.4	58.5	65.9
Mississippi	14.0	31.9	40.5	45.6
Missouri	24.4	55.0	69.7	78.5
Montana	13.5	29.9	37.9	42.6
Nebraska	14.0	30.3	38.5	43.3
Nevada	8.7	20.3	26.0	29.4
New Hampshire	4.2	11.0	14.4	16.5
New Jersey	16.8	41.2	53.4	60.4
New Mexico	11.3	25.0	31.6	35.5
New York	56.1	135.1	174.7	197.7
North Carolina	21.1	49.7	63.8	72.0
North Dakota	10.1	22.8	28.5	32.2
Ohio	35.1	82.9	106.9	120.5
Oklahoma	16.6	36.8	46.6	52.5
Oregon	12.9	28.3	35.7	40.2
Pennsylvania	42.0	101.7	132.2	149.4
Rhode Island	4.9	11.9	15.3	17.4
South Carolina	11.3	16.3	33.7	38.0
South Dakota	10.8	24.0	29.9	33.7
Tennessee	18.4	42.3	54.3	61.2
Texas	52.4	117.5	149.0	167.8
Utah	8.4	19.2	24.7	27.9
Vermont	3.9	10.7	14.1	16.1
Virginia	16.8	39.4	50.8	57.4
Washington	14.1	32.1	41.1	46.3
West Virginia	9.6	22.8	29.6	33.3
Wisconsin	20.0	45.6	58.2	65.4
Wyoming	8.5	20.1	25.9	29.3
Hawaii	3.2	3.7	3.9	4.0
District of Columbia	5.1	12.2	15.7	17.7
Puerto Rico	4.8	5.7	5.9	6.2
Alaska	0	1.9	13.2	13.5

for application data on Tournatractor, see next page . . .

than that of your present day crawler tractors.

Check, too, present prices of crawlers vs Tournatractor and note approximately 10% saving for Tournatractor compared with crawler tractors having similar engine horsepower and with torque converters.

Plan for delivery of at least one of these rubber-tired units in time for fall operation on present jobs. This will give you some experience in planning operation and training your operators to get the most out of these high-speed units for maximum profit on next year's jobs. This addition to your fleet will also speed up your clean-up on fall and winter work on present contracts so as to clear the deck for early starts on new contracts next spring. After you have had the opportunity to use one of these rubber-tired tractors on your job, we are sure you will want more for the extensive highway program ahead.

Is your
tractor fleet
ready

for next year's
roadbuilding?

(continued)

In your *pioneering tractor fleet* you will find that there is a place for the advantage of speed and mobility of Tournatractor, as well as for the advantage of extra low-speed drawbar of crawlers.

If you will give a little thought to your pioneering tractor operations, you will realize that they involve a considerable percentage of light clearing; a lot of shallow cuts for access, detour and haul-road construction, considerable fast work on temporary drainage for keeping work-areas dry, together with frequent movement of equipment.

pioneering



By dividing the pioneering assignments, you can use crawlers where you get an advantage from their extra traction which provides a plus in drawbar at speeds of 1 to 1½ miles per hour. You can use the faster, more versatile Tournatractors to speed the lighter clearing and grading together with the hit-and-run assignments. Teaming advantages of crawler with those of rubber will give you a considerable overall saving in time and expense.

Studies indicate that, on most jobs, Tournatractor makes the best buy for 25 to 50% of the pioneering fleet applications.

Next, check your *fill-tractor operation*. Have you ever made a time study to show just what your fill tractors are doing? If not, it might be a good thing for you to get a check on just what these tractors are doing over a period of at least a week. We believe this will show some rather interesting, and perhaps surprising, things about just where your money goes on the fill operation. On most jobs, we think your studies will show there is no work on the fill that requires the plus of crawler traction and the resulting lugging advantage of a slow-speed drawbar rating.



filling

As to soft going, remember that Tournatractor can work on spreading and compaction effectively whenever you have dirt that is acceptable for fill construction. Remember, too, that, when working on compaction, Tournatractor puts a 20-ton roller in front of your 50-ton compactor for a big advantage that doesn't cost you an extra dime.

Then, we believe your time-study will also show that there is a surprising lot of emergency dozing where you borrow a fill-tractor to help out on a trouble-spot here and there on the right-of-way. Certainly, these off-the-fill assignments call for at least one fill tractor that can





run! A fill tractor usually gets these emergency assignments because you can borrow it for an hour or so without delaying your production. With a 17 mph rubber-tired tractor, you can get to these emergency jobs faster, do them quicker, and get back in half the time.

Also, give consideration to the compaction characteristics of those big, low-pressure tires as they spread the fill. This valuable plus saves more of your roller time.

Make your own studies and check our claims. We are, of course, prejudiced, but we think you'll find you can save money by using rubber for over half of your fill tractor assignments.

Now let's look at the cut. Our 416 hp Twin-C Pusher is, of course, our recommendation for push-loading scrapers in the 18 to 25-yd. class on volume earthmoving. But, for push-loading in hard digging materials on smaller jobs, we'd say most of your present crawlers in the 200 hp class are your best bet. However, on the big yardage jobs where you're working a number of pushers in a cut or operating more than one scraper fleet at a time, we would recommend that you have

one or two Tournatractors in your pusher fleet. This makes it easy to balance long and short haul operations by transferring the high-speed, rubber-tired units as needed to keep your scrapers moving pay-dirt at maximum efficiency.



pushing

As you check time-study cycles with Tournatractors pushing, you'll find, too, that Tournatractor's speed and instant gear-change has advantages in performance not readily apparent. They may require a lighter scraper cut and an extra 10 to 20% in distance to load, but you'll find, in most materials, they still match crawler pushers in loading time. They also are usually faster on re-

turn, and, after the operator gets familiar with them, can save time in positioning. By and large, however, their big advantage for pushing service is in providing a flexible pusher fleet ready to adjust to job requirement, 2 or 3 times a day if necessary, with loss of time for moving measured in only a few minutes. With alert supervision, and intercommunication system between spreads, this can be very important.



finishing

When you study your *final clean-up-and-finishing* work problems, we think you'll readily agree that this application is another place where speed and mobility are the two prime requisites of profitable performance. Compaction advantages of big, low-pressure tires are an asset. These do not rough up the finish grade as do crawler grouzers. Range of work area is often larger and well adapted to speed application. Movement along the right-of-way is extensive and high travel speeds are needed for turning out maximum work at lowest cost. Once you've tried Tournatractor on this finishing work, you'll rate it tops for production and profit.

With both crawlers and rubber on the job, you'll find good supervision can easily assign each to the duties where its individual advantages make you the most money. You've a place for crawlers and a place for rubber ... worked as a team, they meet the new problems of earthmoving for profit in your present and your future operations.

See next page for new developments that make rubber more effective



Is your tractor fleet ready for next year's roadbuilding?

(continued)

In considering your allocations for rubber-tired tractors to make maximum use of their speed and mobility, and of crawler tractors to make maximum use of their advantage in low-speed traction, be sure to consider these factors:

1. On dozing operations, your tractor operators probably shift gears twice per minute of operation, 100 times in a 50-minute hour, 1,000 in a 10-hour day. Time studies indicate you lose 5 seconds (plus momentum) on each of these gear shifts. Tournatractor's instant shift through constant-mesh transmission therefore can give you a plus of 5,000 seconds or 80 minutes production time in a 10-hour day!

2. Drawbar ratings on crawler tractors are made on basis of *clean tracks and rollers*. You have only to look through the tracks at your pan and guards to realize that these theoretical ratings are never available on your actual dirtmoving operation. Power used in grinding sand, rock, dust, and mud in moving parts of the track assembly is not available for moving dirt.

3. When you compare maintenance costs try to check on *how many MILES you get on a set of*

tracks. On fairly rough work, owners usually replace a set of tires in from 3,000 to 5,000 hours. At an average travel of six miles each hour this represents from 18,000 to 30,000 miles of Tournatractor travel. On an average, we think you will find your *mileage* on a set of tracks will show less than half your *mileage* on a set of rubber tires. Incidentally, combined cost for labor and parts for complete track rebuilding is more than double that for recapping a set of tires. A complete set of tires can be replaced in a few *hours*; reconditioning a set of tracks takes at least double that many *days* of hard work.



4. We now offer, as optional equipment, 26.5 x 25 wide-base tires for Tournatractor. These tires give

about 20% more traction area. They are recommended for use wherever extra flotation is needed for soft going, or where extra traction is needed for a plus in drawbar over loose dirt, soft clay, sand or other types of soft footing.

5. Hydroflotation of tires offers means of obtaining extra traction and drawbar over standard Tournatractor ratings when needed.

6. Do not overlook the price advantage in favor of Tournatractor! Also the fact that for 10% less you get a much greater value. You have antifriction power from engine to drive-wheels, dirt-tight oil-enclosures and grouped lubrication through a minimum of lube points. You have the simplest system of controls, push-button operation, maximum visibility. Many other safety features.

Your nearest distributor, listed on the opposite page, will be glad to give you complete information on Tournatractor advantages for your specific operation.

This is the fourth in a special series of Tournatractor advertisements discussing its suitable applications and comparing its characteristics in meeting the four dimensions of present day earthmoving ... power ... traction ... speed ... and mobility. Reprints of the three previous advertisements are available from your distributor or will be gladly mailed to you direct from Peoria if you will write for the "Four-Dimension Series".

For information on high-speed earthmovers see your nearest distributor listed below:

Alabama
G. C. Phillips Tractor Co., Inc., Birmingham
Chris J. Sherlock, Inc., Montgomery

Alaska
Bashaw Equipment Co., Anchorage

Arkansas
Clark Equipment Co., Inc., Little Rock

Arizona
Road Machinery Co., Phoenix

California
Crook Co., Los Angeles, Bakersfield
Ferguson & Blakemore Mach. Co., Oakland, Sacramento

Colorado
Johnson-Tudor Co., Denver

Connecticut
The Rowen-Leahy Co., Hartford

Delaware
Furnival Mach. Co., Philadelphia,
Harrisburg, New Philadelphia, Pa.
General Supply & Equip. Co., Inc., Baltimore, Md.

District of Columbia
General Supply & Equip. Co., Inc., Baltimore, Md.

Florida
Blalock Machinery & Equipment Co., Inc., Atlanta
Chris J. Sherlock, Inc., Montgomery, Ala.

Georgia
Blalock Machinery & Equipment Co., Inc., Atlanta, Albany, Waycross

Illinois
Illinois Contractors' Mach., Inc., Elmhurst, Peoria
O. B. Avery Co., Inc., St. Louis, Mo.

Indiana
Miller Machinery, Inc., Indianapolis
Stockberger Machinery, Inc., Fort Wayne, South Bend

Iowa
Choate Equipment Co., Cedar Rapids
McShane Co., Inc., Omaha, Neb.
Vivian Equipment Co., Ames

Kansas
The Victor L. Phillips Co., Wichita, Kansas City, Mo.

Kentucky
Contractors Equipment & Truck Co., Inc., Lexington, Louisville

Maine
H. F. Davis Tractor Co., Boston, Cherry Valley, Mass.

Maryland
General Supply & Equipment Co., Inc., Baltimore

Massachusetts
H. F. Davis Tractor Co., Boston, Cherry Valley

Michigan
Telford Equipment Co., Lansing, Grand Rapids, Detroit
Miller, Bradford & Risberg, Inc., Escanaba

Minnesota
The George T. Ryan Co., Minneapolis, Hibbing

Mississippi
Allied Equipment Co., Inc., Jackson

Missouri
O. B. Avery Co., Inc., St. Louis
The Victor L. Phillips Co., Kansas City

Montana
Western Construction Equip. Co., Billings, Great Falls

Nebraska
T. S. McShane Co., Inc., Omaha

Nevada
Pioneer Equip. Co. of Nevada, Inc., Reno

New Hampshire
H. F. Davis Tractor Co., Boston, Cherry Valley, Mass.
Reynolds & Son, Inc., Barre, Vt.

New Jersey
Furnival Mach. Co., Philadelphia,
Harrisburg, New Philadelphia, Pa.
Hodge & Hammond, Inc., New York, N.Y.

New Mexico
Contractors' Equip. & Supply Co., Albuquerque

New York
Atlantic Tug & Equip. Co., Inc., Syracuse, Whitesboro, Massena, Albany
Cameron Equipment Corp., Buffalo
Hodge & Hammond, Inc., New York City

North Carolina
Interstate Equipment Co., Statesville

North Dakota
Kridler Equipment Co., Inc., Fargo

Ohio
Carroll & Edwards Co., Cincinnati
Cleveland Contractors Equip. Co., Cleveland
Columbus Equip. Co., Columbus, Toledo

Oklahoma
Wylie-Stewart Machinery Co., Inc., Oklahoma City, Tulsa

Oregon
Loggers & Contractors Mach. Co., Portland, Eugene

Pennsylvania
Furnival Mach. Co., Philadelphia,
Harrisburg, New Philadelphia
A. T. Green Mach. Co., Pittsburgh

Rhode Island
H. F. Davis Tractor Co., Boston, Cherry Valley, Mass.

South Carolina
State Machinery & Supply Co., Inc., West Columbia

South Dakota
Sheehan-Bartling, Inc., Sioux Falls

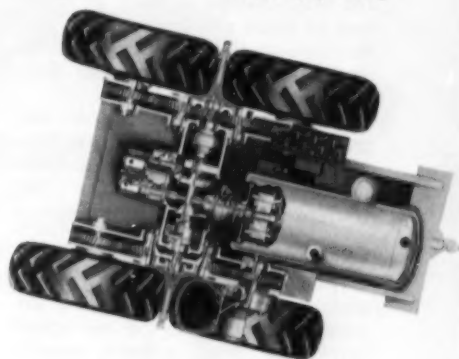
Tennessee
Dempster Brothers, Inc., Knoxville, Nashville
Priester Machinery Co., Memphis

Texas
Berry Brothers Mach. Co., Dallas
Contractors' Equipment & Supply Co. of El Paso, El Paso
South Texas Equip. Co., Inc., Houston, San Antonio
Texas Mach. & Equip. Co., Inc., Amarillo, Abilene, Lubbock

Utah
Rocky Mountain Machinery Co., Salt Lake City

Vermont
Reynolds & Son, Inc., Barre

Virginia
Richmond Mach. & Equip. Co., Inc., Richmond, Lynchburg



Washington
Western Tractor & Equipment Co., Seattle

West Virginia
West Virginia Tractor & Equipment Co., Charleston, Clarksburg

Wisconsin
Miller, Bradford & Risberg, Inc., Eau Claire, Madison

Wyoming
Moss Equip. & Supply Co., Casper

CANADA

Alberta
Construction Equipment Co., Ltd., Edmonton, Calgary

British Columbia
Vancouver Equipment Corp., Ltd., Vancouver

Manitoba
Construction Equipment Co., Ltd., Winnipeg

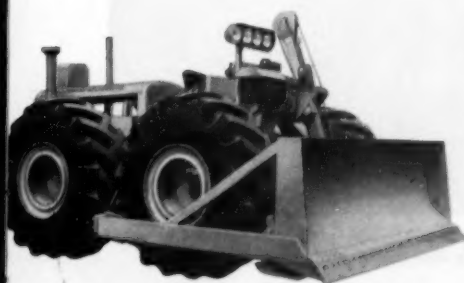
New Brunswick
La Have Equipment Ltd., Fredericton

Nova Scotia
La Have Equipment Ltd., Bridgewater

Ontario
Equipment Sales & Service, Ltd., Toronto

Quebec
Automotive Products Co., Ltd., Montreal, Rimouski

Saskatchewan
Construction Equipment Co., Ltd., Regina
Tournatractor—Trademark Reg. U.S. Pat. Off. CT-1164-G



LeTourneau-WESTINGHOUSE company
PEORIA, ILLINOIS

A Subsidiary of Westinghouse Air Brake Company

Crane Boom Reaches 230 Feet

A MARINE DERRICK boat sporting 230 ft of boom is a standout performer in construction of piers for the \$18 million Kingston-Rhinecliff Bridge over the Hudson River 100 mi north of New York City.

It is a steam-powered American rig with a 210-ft boom and a 20-ft jib. Merritt-Chapman & Scott Corp., contractor for the New York State Bridge Authority, uses it to lift huge 35-ton sections of forms and to place reinforcing steel and concrete up to 200 ft high. M-C&S says it helps cut pier erection time considerably.

The bridge is a simple girder and truss type sitting on 30 concrete piers, eight of which rise up from the river. The bridge spans 7,793 ft from abutment to abutment.

Concrete Foundations

River pier foundations, all of which measure $86\frac{1}{2} \times 36\frac{1}{2}$ ft, are concrete faced from the low water mark up with granite blocks. Foundations consist of a sheet piling cofferdam driven around steel bracing. Cofferdams are sealed with tremie concrete, granite block facing is placed, and the core is filled with concrete.

Prefab Forms

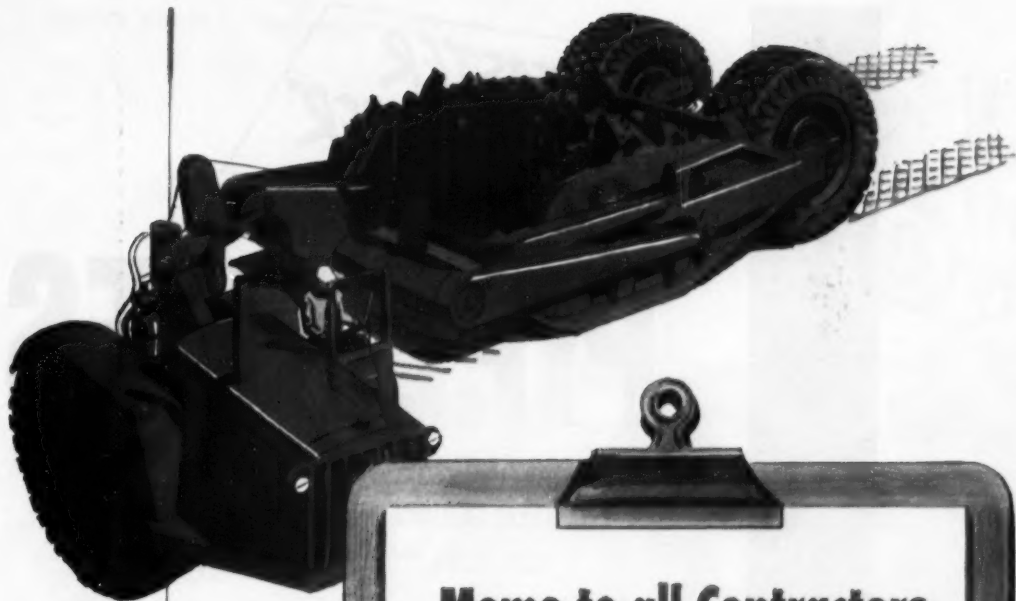
Pier forms are fabricated on barges during foundation construction. M-C&S uses four 11x48-ft panels for each of the eight piers. Forming and pouring is successive. Each form panel is faced with $\frac{5}{8}$ -in. plywood backed by 1x6-in. tongue and groove stock and braced with 3x6-in. wales, 16 in. on centers. Further bracing is provided by bolting to the form face 12-in. channels placed back to back and spaced 24 in. on centers. To facilitate lifting the sections, 48-ft lengths of H-beams are welded across the backs of the channels. Each H-beam has a hole burned through its top to engage the crane hook.

Reinforcing steel also is prefabricated in 48-ft lengths with bars welded at connections to prevent breaking up during lifting. Steel first is placed and welded to dowels left protruding from preceding pours. Forms then are lifted in place, held temporarily secure by steel cables attached to H-

Continued on page 113



VERSATILE CRANE SPEEDS erection of eight 200-ft-high piers for Kingston-Rhinecliff Bridge across Hudson River in New York. It places forms, reinforcing, and concrete.



Memo to all Contractors who want better service at lower cost

For dependable operation of your equipment on all jobs, under all conditions—heat or moisture, dust or mud—use Phillips 66 diesel fuels, heavy duty motor oils, greases and gear oils.

Phillips 66 individual service is unsurpassed. A Phillips 66 lubrication engineer will consult with you right on the job. He will make recommendations for the right fuels and lubricants, and will help you set up a storage and service area for the operation.

Phillips 66 facilities and transportation assure you of a dependable supply of all petroleum products in the necessary quantities to keep your job rolling.

For full details, write: Sales Department,
Phillips Petroleum Company, Bartlesville, Oklahoma.



● Phillips 66 fuels, heavy duty motor oils, greases and gear oils meet manufacturers' specifications. Cut maintenance costs and downtime. Switch to Phillips 66 products now.

It's Performance That Counts!

PHILLIPS 66 HEAVY DUTY MOTOR OILS

Fuels and Lubricants for Construction Machinery



**"FASTER
FROM FOSTER"**

PIPE PILES

**FOR CAST-IN-PLACE CONCRETE PILES,
FOSTER SERVICE ON SPIRAL-WELD PIPE
CAN GIVE YOU BIG JOB SAVINGS**

Big welcomes are being earned among contractors everywhere by the job advantages of Foster service on pipe for piling. Wherever the right product and dependable service pay off in savings, the full-job quantities which we can supply will allow you to get deliveries to your work schedule . . . thus avoid storage problems on the job site and avoid danger of work interruption. This stronger spiral-weld pipe is ideal for cast-in-place concrete piles. It has been driven 134 feet to refusal without damage or distortion—is lightweight, easy to handle, and drives straight without the use of a mandrel . . . can be supplied with driving points or plates mill welded, when required.

We are specialists in all kinds of pipe for piling—Spiral Weld, Electric Weld, Seamless and Lap Weld, in all diameters—in standard, thin or heavy wall thicknesses. Let us quote you on your next foundation job. Driving Logs and catalogs—yours for the asking.

***L.B. FOSTER* co.**

PITTSBURGH 30 • NEW YORK 7 • CHICAGO 4
ATLANTA 8 • HOUSTON 2 • LOS ANGELES 5

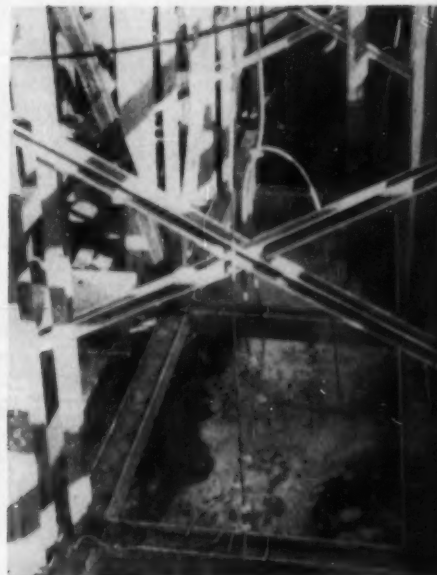
ALL YOUR PILING

Ask about our rental plan on steel sheet piling. Send for catalog.





CONTRACTOR POURS tremie seal at bottom of sheet piling cofferdam with 100 yd per hr floating concrete plant. Hoist lifts concrete from mixer and discharges it down chute.



STEEL BRACES PREVENT sheet piling from buckling during tremie seal pouring.

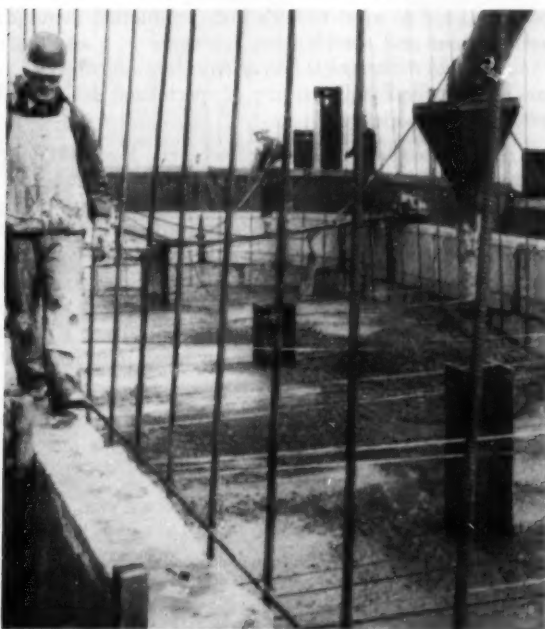
beams on the pier foundation, and bolted to one another by tie rods joining corners to corners. The crane places concrete with 1½-yd bucket.

When concrete has cured, new reinforcing is added and welded to steel placed earlier. Then the forms are raised 48 ft. M-C&S

adds the jib to the derrick after forming has passed the 100-ft mark. Jib cables then are locked to the crane's gantry, and its boom is operated at a 59-ft radius. Locking the boom prevents tipping the barge and permits greater control in lifting and placing forms. Land pier construction is similar to the

river work, but lifts are not so high, and extra long crane booms are not needed.


Construction is under the supervision of M-C&S's project manager Jess Comer working under the company's marine and heavy construction division headed by Frank R. Creedon.



CONCRETE FILLS core left after workmen lay granite block facing. Metal straps prevent blocks from falling out during pour.



CRANE LIFTS bucket over first section of formwork placed on granite-faced pier foundation. Batch plant supplies concrete.



• **BIG CAPACITY—HEAVY DUTY MACHINERY** is what you need to meet today's high production demands for both cement and specification aggregate . . . and that's what you get with the complete line of Nordberg Machinery . . . all backed by over a half century of specialized design and manufacturing experience.

This dependable line of heavy machinery has long been recognized throughout the cement, aggregate and construction industries for maximum, continuous production of big tonnages at lowest possible cost . . . including Symons® Gyrotory and Cone Crushers for primary and fine reduction crushing; Symons Vibrating Grizzlies and Screens for scalping and sizing; Grinding Mills for wet and dry grinding; Kilns and Coolers; and a complete line of Nordberg Engines from 10 to over 12,000 horsepower to meet practically all power requirements.

Write for literature on the Nordberg Machinery you need to efficiently produce large tonnages of quality cement, aggregate and sand to meet the most rigid specifications.

NORDBERG MFG. CO., Milwaukee, Wis.

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Q156

Typical of today's modern highway construction is this view of the new Freeway in Oakland, Calif., showing 3 levels of highway structure over 2 levels of railroad. (Photo courtesy California Division of Highways)

SYMONS . . . A Registered Nordberg Trademark known throughout the world.

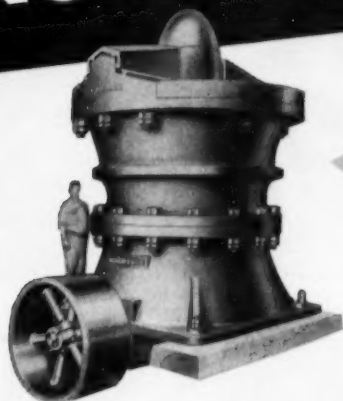


NORDBERG



MACHINERY FOR PROCESSING ORES and INDUSTRIAL MINERALS
NEW YORK • SAN FRANCISCO • ST. LOUIS • DULUTH • WASHINGTON
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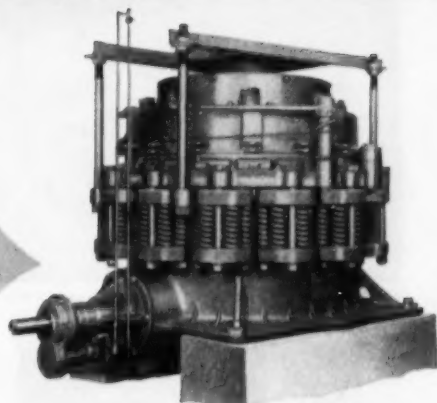
GET **BIG TONNAGES** OF CEMENT AND AGGREGATE WITH **NORDBERG MACHINERY**



SYMONS® GYRATORY and CONE CRUSHERS

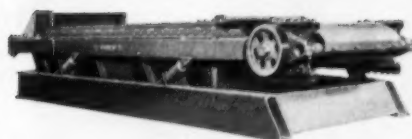
Gyratory crushers built in sizes from 30" to 72" feed openings, for capacities up to 3500 or more tons per hour.

Cone crushers built in Standard, Short Head and Intermediate types, in sizes from 22" to 7", in capacities from 6 to 900 or more tons per hour.



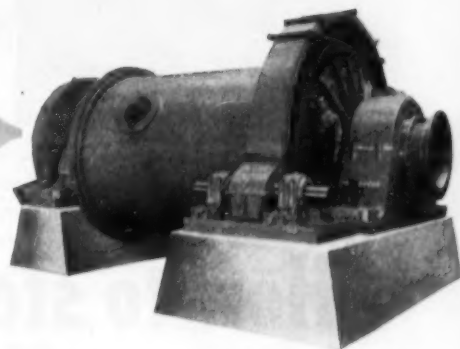
SYMONS VIBRATING SCREENS and GRIZZLIES

Built in a wide range of types and sizes to meet practically all requirements from heavy scalping to fine screening applications.



NORDBERG GRINDING MILLS

Include ball, pebble, tube, rod and compartment types for wet or dry, open or closed circuit operation. Sizes to 13' diameter and up to 50' long.

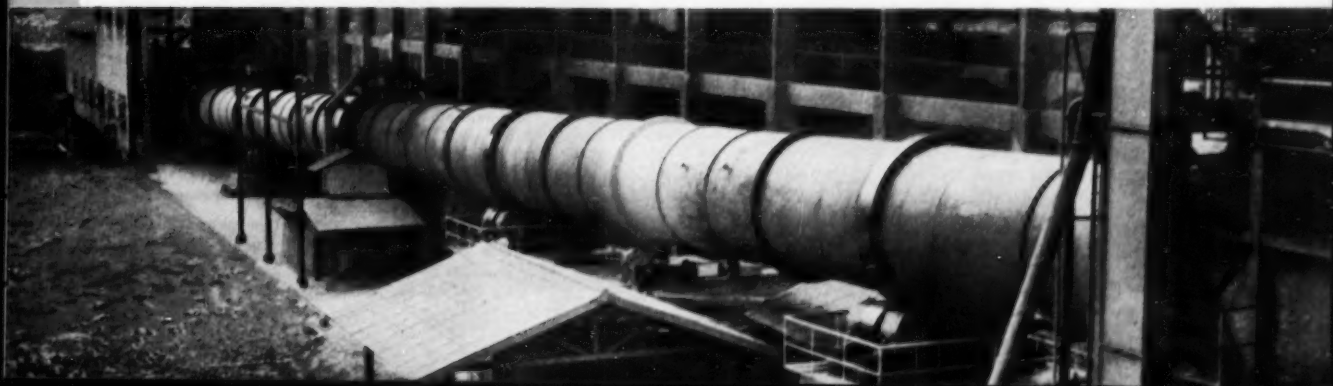
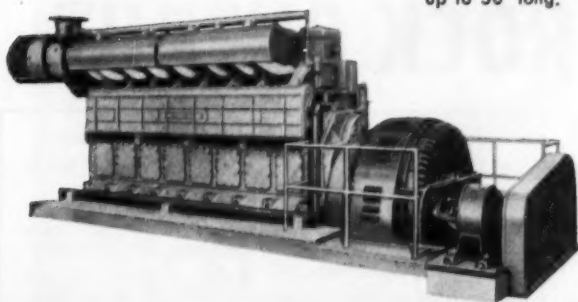


NORDBERG ENGINES

Built in a wide range of sizes from 10 to over 12,000 horsepower, including Diesel, Dualfuel® and Spark-Ignition Gas types for low cost power generation.

ROTARY KILNS

Nordberg Kilns, Dryers and Coolers are built for pyro processing operations, calcining, burning and cooling.





POWER HYDRAULIC CONTROLS and hydraulic-actuated clutches keep even the roughest jobs rolling smoothly. Hydraulic sys-

tem eliminates need for more than 100 mechanical parts. Self-compensating clutches need no close or frequent adjustments.



TOUGH, IMPACT-RESISTANT STRUCTURE with all-welded, stress-relieved lower and upper frame helps rig absorb digging shock ... handle the worst rock jobs with little need for maintenance and repair.



MORE POWER — Anti-friction bearings, splined shafts, precision machinery alignment help convert more of rated horsepower into usable power. Rugged construction permits use of extra power.



SPECIAL EXCALODER ATTACHMENT for underground loading or general bulk materials handling. The Excaloder features straight line bucket action and unusually low overhead clearance.

How to step up **ROCK OUTPUT**

Be ahead on every job with all these Link-Belt Speeder features

WHATEVER size rock rig you need, there's an advanced-design Link-Belt Speeder that can handle rugged work faster, easier, at less cost per ton or yard. Every Link-Belt Speeder rock shovel offers you Speed-o-Matic—the true power hydraulic control system. It's designed to make the operator's job so easy, so non-fatiguing that he'll utilize the machine to its full productive capacity—all shift long. And what a capacity! On-the-job figures show that Speed-o-Matic—even when the machine is wading through shot rock—accounts for output increases of up to 25% or more per shift!

Precision built throughout, a Link-Belt Speeder has an all-welded, stress-relieved upper and lower frame. Its power train features anti-friction bearings, splined shafts and cut spur gears. Quality construction like this pays off in lasting top performance, lower costs for maintenance and service.

For details, see your distributor or write **LINK-BELT SPEEDER CORPORATION, CEDAR RAPIDS, IOWA.**

Faster, stronger — from boom tip to treads

- Rugged, all-welded upper and lower frames, plus all-welded boom and dipper sticks for maximum strength-to-weight ratio
- All-manganese bucket*
- Powerful Independent Chain Crowd for positive crowd and retract, minimized maintenance
- Hydraulic dipper trip
- Torque converter units for greater shock absorption, multiplied torque when digging gets rough*
- Self-cleaning tracks and drive sprockets
- Powerful, two-directional automatic traction brakes which serve as digging locks
- Large diameter ring gear and conical rollers for faster, smoother swings
- Two-speed travel in either direction**
- Independent Swing and Travel that saves one hour a day in shifting time**
- Sealed track rollers keep grease in, dirt out**

*Optional, extra

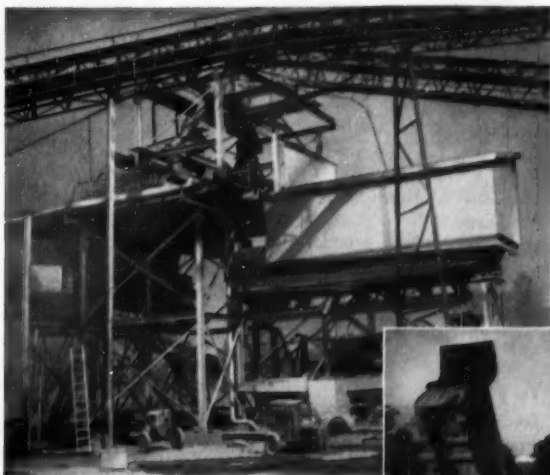
**For most models

LINK-BELT SPEEDER

Builders of a complete line of crawler and rubber-tired shovel-cranes

12,004

PRODUCING AGGREGATES



CONTRACTORS' aggregates plants range from simple portable units to complex multiple-unit plants. Equipment is available to produce aggregates efficiently from a wide variety of material for all types of jobs.

Techniques for producing aggregates have developed rapidly in the last few years to keep pace with increasingly stricter specifications. The efficiency of a contractor's aggregates production often is the difference between success and failure on a job. To provide our readers with the best information available, CM&E begins this month a series of articles on aggregates production written by experts in the field.

(begins on next page)



1. Types of Aggregates

By W. A. RUNDQUIST
Pioneer Engineering Works, Inc.

Mr. Rundquist is a mechanical engineering graduate of North Dakota State College. He is vice chairman, Manufacturers Division, of both the National Crushed Stone Association and the National Sand and Gravel Association. He also holds a reserve commission as a Major in the Corps of Engineers.

AGGREGATES BUSINESS is big business. In fact, the tonnage of aggregates produced in this country is greater than that of any other mineral. The industry has grown tremendously in the last 10 to 15 years. There now are more than 10,000 aggregates plants in the U. S. with a combined output of about 850,000,000 tons annually.

The bulk of this production goes into construction projects. Highway construction alone consumed 403,000,000 tons of aggregates in 1955 and will take increasingly larger tonnages in the next few years.

The annual U. S. production of aggregates is valued at more than \$500 million. It comes from about 1,700 commercial crushed stone producers and more than 3,000 sand and gravel plants. In addition, a large number of the 5,000 big heavy construction contractors in the U. S. operate plants to produce aggregates for their own jobs.

Rock and gravel formations of one kind or another are found practically all over the earth's surface, but in some areas a great amount of organic matter must be removed to expose material suitable for aggregates. We shall consider aggregates to be either sand and gravel or quarry rock that is suitable for both concrete and bituminous road and airfield construction.

Aggregates rocks in various formations throughout the United States, as well as in other parts of the world, vary in hardness from soft shales to hard granites. In general, the best aggregates are made from the hardest, toughest, most durable rocks. Ideally, such rock should be broken into rough, irregular shapes and should be as free as possible of flat or elongated



STATIONARY PLANT processes rock through three stages of crushing and four screening stations. A large electric-powered plant like this will handle tremendous tonnages.

particles. Measuring the hardness of rocks is time-consuming, but the following table—known as Moh's scale of hardness—is a useful quick reference. In this scale, the numbers indicate relative degrees of hardness, with talc being the softest and diamond the hardest.

Moh's Scale of Hardness

- | | |
|-------------|-------------|
| 1. Talc | 6. Feldspar |
| 2. Gypsum | 7. Quartz |
| 3. Calcite | 8. Topaz |
| 4. Fluorite | 9. Corundum |
| 5. Apatite | 10. Diamond |

Some examples of rocks classified by their relative degrees of hardness are:

Soft	Medium
Asbestos	Limestone
Gypsum	Dolomite
Slate	Sandstone
Talc	
Soft Limestone	
Hard	Very Hard
Granite	Taconite
Quartzite	Granite
Iron Ore	Granitic Gravel
Trap Rock	Trap Rock
Gravel	

Among the rocks most commonly used for aggregates are granite, trap rock, quartzite, and limestone.

Granite is durable, tough, and medium to coarse grained. It is hard and wears well under traffic. Granite ranges in color from a dark bluish gray for Pennsylvania granite, to light gray for Vermont,

and reddish shades for Wisconsin. These colors, however, do not necessarily indicate that the granite comes from a particular area. For example, dark gray granite is found at Quincy, Mass., light gray at Barre, Vt., and pink in Westerly, R. I. In North Carolina, there are both light and dark gray granites.

Trap rock has high internal strength and makes an almost ideal concrete aggregate. It is a hard rock, fine grained, tough, and durable, generally without seams or strata. In color it is dark blue to black.

Quartzite, commonly of glass-like appearance, is a compact, hard rock of light color—white, gray, reddish, or buff—and is very resistant to weathering. It is one of the most durable of rocks, yet, because it is in the silica group which is highly abrasive, it is rough on the machinery used to process it.

Limestone is one of the principal sources of construction aggregates. It is softer than granite, trap rock, or quartzite. In texture it varies from coarse to fine. Its color is usually whitish, with variations from gray to bluish gray. It bonds well in concrete and forms a good base for pavements. However, it often contains impurities and sometimes requires extensive processing such as washing and scrubbing. Quite frequently the deposits are covered by variable thicknesses of overburden consisting of clay, sand and gravel, or

(Continued on page 123)



QUEBEC HYDRO-ELECTRIC COMMISSION USES EIMCO 105 TRACTOR-EXCAVATORS ON BERSIMIS PROJECT

The Quebec Hydro-Electric Commission supplied contractors on the huge Bersimis project with several Eimco 105 Tractor-Excavators as the most efficient machines available for certain phases of the job.

Eimco 105's worked on the penstocks at the powerhouse, loaded blasted rock at the diversion tunnel, mucked in the intake shafts, assisted in clean up of the main tunnel, loaded aggregate from the quarries and accomplished numerous other jobs including, (as shown above) the takeup of the bottom in the main tunnel.

The main tunnel bore at Bersimis is 7 miles long and excavated diameter was 45 feet. The intake shaft on the Diversion tunnel was 32 feet in diameter by 120 feet deep. The Bersimis project is scheduled to generate power by July or August of 1956.

Contractors have worked steadily in the face of adverse weather conditions to complete this great work at an early date. Eimco extends its heartiest congratulations on a job well done.

Eimco 105 Tractor-Excavators are at work throughout the world on Hydro-electric development projects, mines, roadbuilding, stockpile loading, pits and quarries and many other rough jobs. In many instances, the 105 is the only production equipment on the job—because its dependability is a well known and proven fact.

If your project calls for a tractor, bulldozer, or excavator, you'll want Eimco to supply you with full information about the versatile 105. Just send details of your project. You'll find, as have many others, that Eimcos will do the job faster, cheaper and better.

THE EIMCO CORPORATION

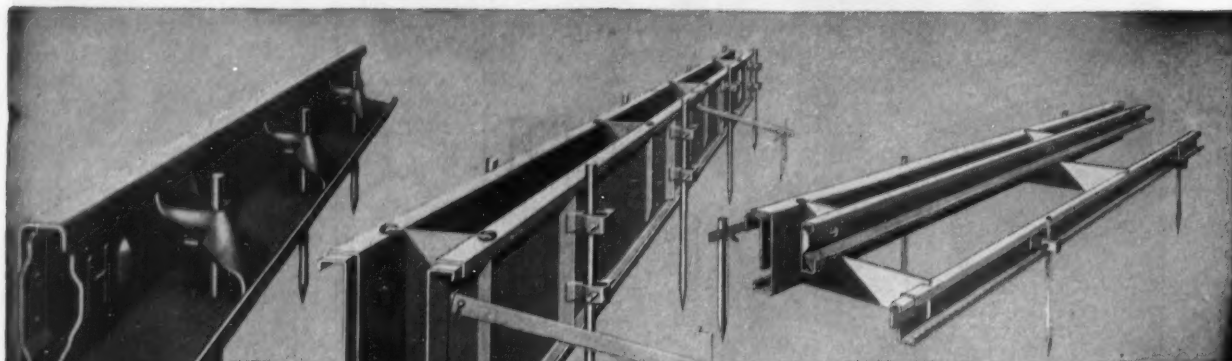
Salt Lake City, Utah—U.S.A.

• Export Offices: Eimco Bldg., 52 South St., New York City

New York, N. Y. Chicago, Ill. San Francisco, Calif. El Paso, Tex. Birmingham, Ala. Duluth, Minn. Kellogg, Ida. Salt Lake City, Utah. Pittsburgh, Pa. Seattle, Wash. Pasadena, Calif. Houston, Texas Vancouver, B. C. London, England. Guelph, Ontario, Canada. Port of Spain, Trinidad. Johannesburg, South Africa.



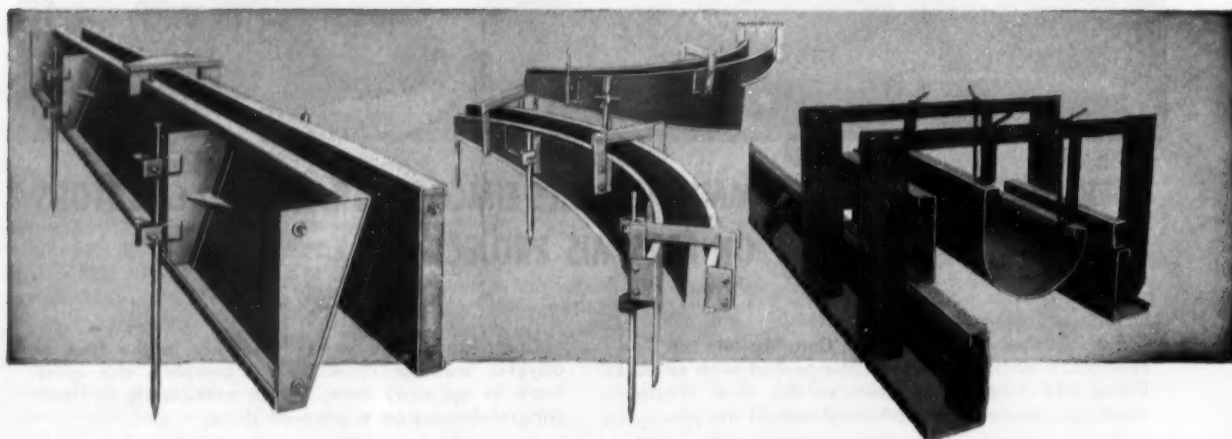
Form Engineering



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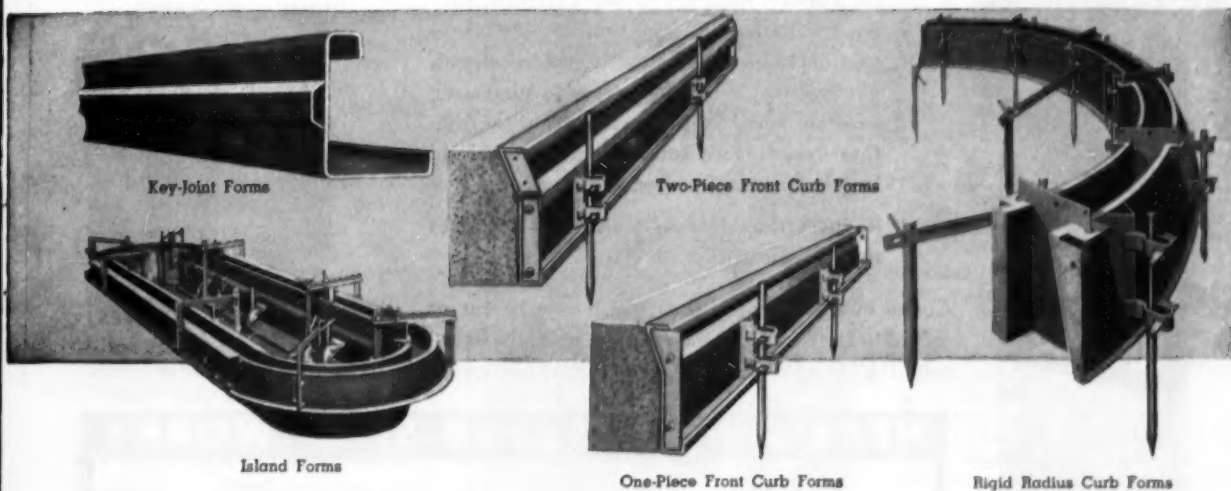
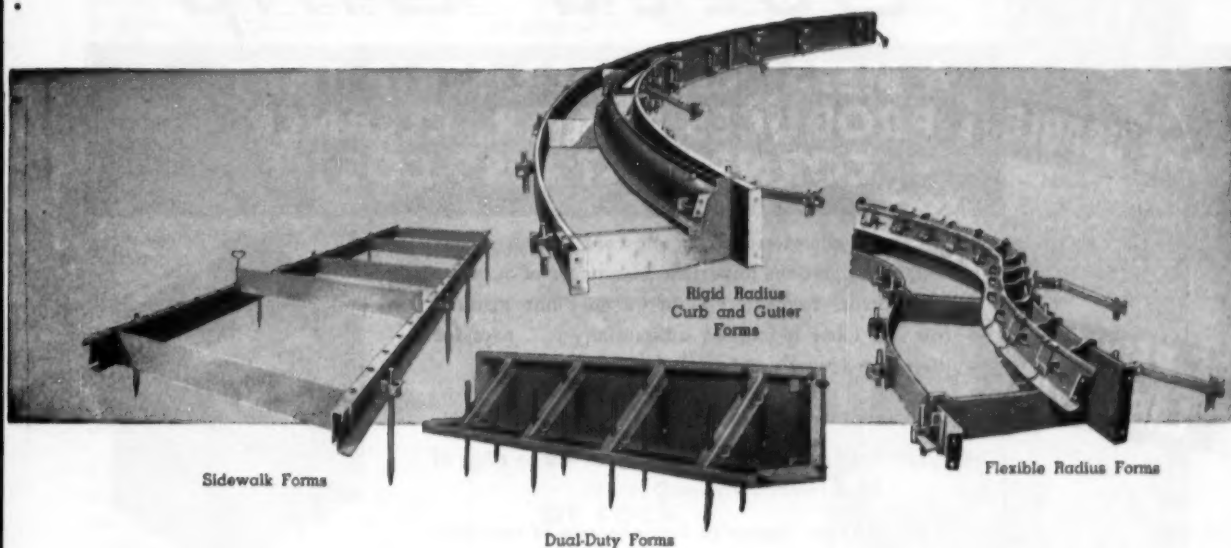
For 49 years, Heltzel has been supplying leading construction firms with the industry's finest engineered forms for the widest range of application.

It is this broad experience that enables Heltzel to better engineer steel forms for any specific requirement. And, because Heltzel engineers are always searching for better forming methods, you can

always be certain you're getting the most up-to-date equipment when you specify "Forms by Heltzel."

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STEEL FORMS



THE HELTZEL STEEL FORM and IRON COMPANY
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SUPERIOR *Speed-Strip*

PAT. APPLIED FOR

**A METAL CHAMFER STRIP THAT
PRODUCES NEATER, CLEANER
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**REDUCES
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**CUTS & BUTTS
TO ANY
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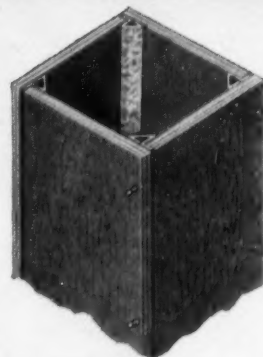
**STURDY
GALVANIZED
STEEL**

For better chamfers in concrete construction at less cost, investigate the important advantages of Superior Speed-Strip. Remember—there's only one material cost . . . labor is reduced substantially . . . pays for itself in a few re-uses!

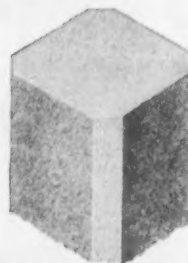
Built for rough contractor usage, Speed-Strip is:

- (a) Easy to handle and quickly nailed to edge of form lumber, plywood, or S4S.
- (b) Reduces damage to forms because of minimum nailing and stripping. As Speed-Strip stays on the form during stripping, the form with chamfer is always ready for re-use. Therefore, only one application to forms is necessary where jobs duplicate column sizes, spandrel beams, pilasters, etc. Where jobs are not typical sizes, Superior Speed-Strip is easily detached from form boards, then cut and butted to desired lengths for many re-uses.
- (c) Reduces time loss in finishing—produces smooth neat corners.

Comes in 8 ft. stock lengths which may be cut or butted to any length. Made of 24 ga. galvanized steel with $1\frac{1}{8}$ " face for concrete contact. Write for sample.



**MINIMUM NAILING AND
MINIMUM WRECKING**



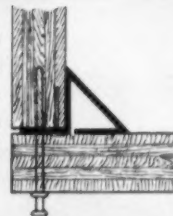
SMOOTH, NEAT CORNERS
Always a uniform size and
shape chamfer

HERE'S HOW Speed-Strip WORKS

Tack Speed-Strip through indentations on to edge of form board with lath type nail.



Place companion form board in position as conventionally done. Drive double-headed nail through.



SUPERIOR CONCRETE ACCESSORIES, INC.

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2100 Williams St., San Leandro, Calif.

PRODUCING AGGREGATES...

continued from page 118

impure stone which must be removed.

Other rocks, softer than the above, but frequently used for aggregates are sandstone, coral, caliche, and coquina.

Sandstone is brown or gray, coarse to fine grained, of medium hardness and density. When crushed it breaks into angular particles. It usually is considered quite abrasive.

Coral consists of the skeletons of small marine animals, cemented together. Its hardness varies considerably. When properly handled it produces excellent results as a base material.

Caliche is a hardpan found near the surface of the earth's crust. It is formed by cementation of small rock fragments by sodium nitrate or calcium carbonate. Considerable quantities are found in the southwestern part of the United States, also in Chile. After it has been broken up and watered down or saturated with water, caliche tends to recement and makes an excellent base material.

Coquina is a limestone containing fossil shells in great abundance. It varies in durability depending on the relative proportions of shell fragments, clay grains, and limey cement. It is found mainly in the gulf coast states where it has been used for road material with excellent results when good drainage is provided.

The rocks mentioned above, as well as a great many more, are products of quarrying operations. In most instances explosives are required to break the rock loose before it can be processed.

Sand and gravel, on the other hand, are products of a type of operation where the material can be dug from deposits, without blasting, by shovel, dragline, clamshell, or dozer.

Generally speaking there are two types of pits from which road material may be obtained:

1. *Borrow pits* from which suitable material may be hauled directly to the construction site and used without further processing.
2. *Gravel pits* in which the aggregates material is mixed with sand, dirt, or clay and requires processing before use.

Two other terms also are used to describe pit sites:

1. *Wet site* is one that is con-

tinually wet, such as stream beds, rivers, or shallow lakes. Frequently, material from a wet site can be screened and used without further processing.

2. *Dry site* is one located above the water table. In such a site the gravel often contains sand and clay and requires some form of processing—crushing, washing, and screening before it can be used as aggregates.

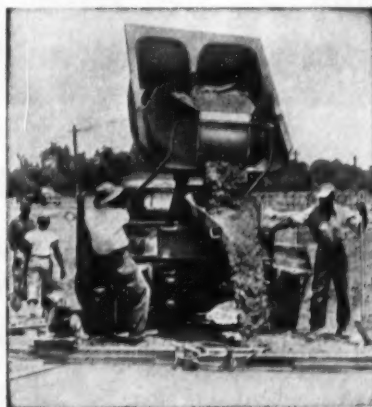
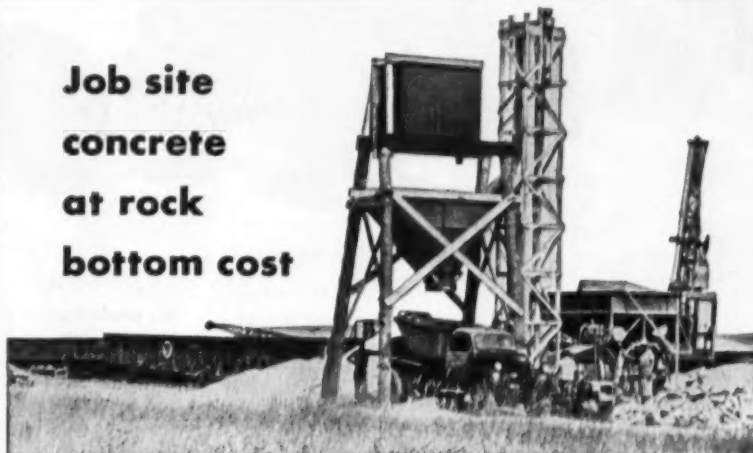
Both sand and gravel are products of pit operations, but there is

a definite distinction between the two.

According to ASTM Standard Designation C 58-28, sand is the fine granular material (usually less than 1/4 in. in dia) resulting from the natural disintegration of rock or from the crushing of friable sandstone rocks. It is important to note that sand today frequently is manufactured when either gravel or quarry rock are run through a crushing and screening plant.

Gravel, according to ASTM (Continued on page 126)

Job site concrete at rock bottom cost



The mixing plant you see above is not fancy. But it produced 100 yards of top quality concrete a day.

The Dumpcrete you see at left is a rugged low-cost unit that hauled every load 8 miles, and delivered uniform concrete to the exact spot it was needed.

"We knew from experience what our 6 Dumpcretes could do," reports H. G. Helgerson, Pres. of McKoy Helgerson of Greenville, S. C. "So we set up the plant at a railroad siding 8 miles from our job at the Parris Island Marine Base."

"Our central plant and the Dumpcretes made a perfect team for handling the scattered pours," he says. "We're money ahead, because we've compared the costs."

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DUMPCRETE**

Fastest from Plant
to Pour

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Big production: at the Camp Dennison, Ohio, plant, a 2¼-yd. Michigan loads out a heaping bucket load of frozen aggregate. Power-shift transmission is standard equipment—cuts seconds off every cycle between truck and pile

**\$76,000* buys one 2¼-yd. truck crane
or four 2¼-yd. Michigan Tractor Shovels . . .**

Here's why Ohio Gravel Co. bought the four Michigans

Ohio Gravel Company operates five plants around the perimeter of Cincinnati. Until a short time ago, ½-yd. and ¾-yd. clamshells and shovels handled all loading from stockpiles. When it became apparent that the Miami plant (300 t.p.h. capacity) did not have adequate loading capacity, Ohio Gravel asked for bids on a special 2¼-yd. mobile crane. According to Walter Flach, V. P. Production, they recognized the need for bigger bucket capacity and better mobility between stock-

piles. Bids on the crane ran from \$65,000 to \$76,000—a substantial price to pay for increased capacity in *only one of the five plants.*

Had to leave the demonstrator

At this point Bode-Finn Co., the local Michigan distributor, got permission to demonstrate a 2¼-yd. Michigan Tractor Shovel at the Miami plant. The "demonstration" lasted two weeks—that is, Ralph Hautman (Miami superintendent) wouldn't

*Current list price F.O.B. factory for four 2¼-yd. diesel Michigan Tractor Shovels.

let them take the demonstrator away until a permanent machine was delivered. Before the new Michigan even arrived, Ohio Gravel Company bought three more for other plants. *The total cost of the four Michigans was approximately the same as the one crane.*

Loads as much as two cranes

At the four plants with Michigans, the superintendents agree that one Michigan loads trucks as fast or faster than two $\frac{3}{4}$ -yd. clamshells. With widely separated stockpiles, the Michigans move around the yards as fast as the incoming trucks—27 mph top speed. They consistently get heaping bucket-loads. Power-shifted cycles between pile and truck average about 40 seconds; it takes 4 minutes or 6 bucket-loads to put 19 tons into a dump trailer (see picture).



A typical heaping bucket-load of graded bank run comes up well over the $2\frac{1}{4}$ -yd. rated bucket capacity. Digging bank run, the Michigan handles approximately $5\frac{1}{2}$ tons per bucket-load.



Handling clean-up work in its spare time, the Michigan eliminates stockpile contamination. Unlike the clamshells which formerly handled the job, the Michigan does not pick up dirt as it cleans up around the piles.

More profits for producer and trucker

Faster travel, faster cycles, bigger bucket-loads obviously make more profits for producer and trucker alike. Ohio Gravel Company recognized this fact when the first Michigan was demonstrated. Your own Michigan distributor will give you this same kind of proof. A chance to demonstrate is all he asks—you name the job.

Michigan is a registered trade mark of



**CLARK EQUIPMENT
COMPANY**
Construction Machinery Division
2403 Pipestone Road
Benton Harbor 18, Michigan



It took four minutes to put 19 tons of material into this dump trailer. Six bucket loads filled it. Note that the $2\frac{1}{4}$ -yd. Michigan

has plenty of dumping clearance over the 10-ft. high side boards. Even with batch boards in place, the Michigan has no trouble.

PRODUCING AGGREGATES ... continued from page 123

Standard Designation C 125-48, consists of coarse granular material, larger than sand, resulting from the erosion of rock by natural agencies. There seems to be no definite upper limit on the size of the stones in gravel. Commercial gravel usually does not run larger than 2½ in. to 3 in., but rocks up to 6 in. often are included. Gravel is most abundant in the states west of the Mississippi, particularly in the area covered by what is generally known as the great glacial moraine.

While quality of rock is the most important factor to consider in the selection of a site for a quarry or gravel plant, other factors should not be overlooked. The best aggregates are those produced from rock that is clean, hard, tough, and durable. Yet such other factors as proximity to the job or trade area, access to the pit or quarry, and the quantity of stone available should be considered. Drainage and overburden, too, are factors in site selection.

Many an otherwise successful operation has run into difficulty

because adequate attention was not paid to the matter of drainage. Mud and water seriously hamper the operation of wheel and track equipment, and plant foundations are apt to settle unevenly or give way if drainage is neglected.

The experienced contractor, gravel producer, or quarry operator will know, of course, what to look for before setting up an aggregates plant. To the inexperienced, however, it is well to point out that considerable testing of the proposed site will prove to be worth while.

Gravel pits vary considerable in area and in depth of layers. A gravel stratum may taper off so that the actual quantity in the deposit is less than anticipated. There may be too much sand, requiring excessive sand removal measures, or too many large boulders which cannot be processed with the equipment at hand. Likewise, there may be an excess of dirt and organic matter, or clay and silt which involve removal measures too costly for the job.

A proposed quarry site, too, should be thoroughly investigated before setting up for operation. The strata of rock should be in-

spected to be sure that a sufficient quantity of good rock is available. Proper attention should be paid to the direction of the face with respect to the bedding planes to avoid dangerous overhangs or slopes that make rock removal difficult. And tests should be made for the presence of rock that is too soft or contains an excess of dirt or organic matter.


Finally, before setting up a quarry plant, the operator must determine whether a single bench or a multiple bench operation will be the most suitable and economical. In quarrying operations, the inexperienced will do well to secure the advice of a qualified blasting engineer and an equipment specialist before making a final decision.

In addition to the open pit method of obtaining materials, mention should be made of dredging operations for sand and gravel and or underground mining of quarry rock.

In some areas dredging for sand and gravel is more feasible than the open pit method. Dredging may be done by floating dredges or by drag lines on the shore. Mate-

(Continued on page 130)

These pumps turn "tough" jobs into "PROFIT" jobs!



FROM 1" TO 10"

CMC DUAL PRIMERS

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- Self Cleaning Case
- Lighter Weight
- Long Life Seal
- Half the Parts
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Contractors "in the know" insist on CMC Dual Primers! They've learned from on-the-job experience that they can rely on the exclusive features of these pumpers to give **FASTER DUAL PRIMING — MORE DEPENDABLE OPERATION — LONGER LIFE WITH LESS MAINTENANCE.** Get full details today.

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Road Building Contractors and Engineers!

The HYSTER® "GRID" ROLLER

**Gives You Three
Machines in
One!**



Road builders all over the country today are using the Hyster "Grid" Roller on three major road construction and maintenance operations:

**HIGH-PRODUCTION COMPACTION
LOW-COST ROCK CRUSHING
EFFICIENT BITUMINOUS SALVAGE**

These three "Grid" Roller applications have proved this machine's value on job after job, on all types of road construction—free-ways, secondary roads, farm-to-market roads and logging roads.

Your Caterpillar* Dealer salesman has information that will enable you to increase production and cut costs. Possibly a demonstration can be arranged on your present job. Call him *today*, or write for Forms 1374 or 1375.

See The New Hyster Company sound, color movie "Road Building With The 'Grid' Roller"



1 EMBANKMENT COMPACTION—high speed rolling (up to 15 MPH towed by Caterpillar DW15 Tractor) matches compaction production with yardage of high-speed earth movers.



2 ROCK CRUSHING—pit-run rock can be efficiently and cheaply crushed for base and surface courses on secondary road construction and repair.



3 BITUMINOUS SALVAGE—"Grid" Roller quickly breaks down old ripped-up mat. Salvages all of the old aggregate and reusable binder for use in new surface.

HYSTER COMPANY

The "Grid" Roller
for all types of
Road Building

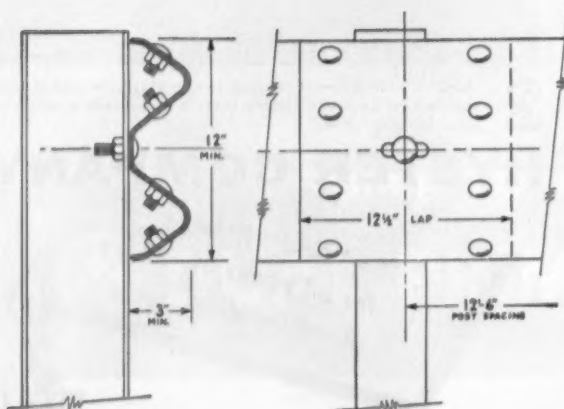


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"Grid" is the registered trademark for the Hyster open-surfaced roller.
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For Safety at Highway Danger Spots Use Bethlehem Beam Guard Rail



Used at sharp turns, embankments and bridge approaches, Bethlehem Beam Guard Rail forms an effective and dependable service for today's high-speed traffic. At these danger spots, Bethlehem Beam Guard Rail has the strength to withstand considerable shock from a colliding vehicle, yet enough flexibility to re-direct the vehicle parallel to the rail.

Used as a highway divider, Bethlehem Beam Guard Rail helps to reduce accidents in respect to opposing streams of traffic.

Bethlehem Beam Guard Rail is made from 10- and 12-gage steel, bolted with a 12½-in. overlap to make one continuous, impact-absorbing beam. It's easy to install and requires no anchor rods, special tools or complicated adjustments. Details and dimensions are illustrated here.

The nearest Bethlehem sales office will be glad to supply complete information on Bethlehem Beam Guard Rail.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.
On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. Export Distributors: Bethlehem Steel Export Corporation

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AUSTIN-WESTERN HYDRAULIC CRANE

**SERVES TWO PLANTS
NINE DEPARTMENTS**

**at Hunter Douglas
Aluminum Corp.**



Effects Savings in Manpower, Time, Avoidance of Outside Jobs, Shipping and Maintenance Labor

Here's What They Say—"This hydraulic crane with its 18' extensible boom and 6' manual extension, its compact design, large tires to grip the ground and 4-wheel power steer for maneuverability soon showed other departments the economies to be made with the A-W when it is not required by shipping. This versatile tool has served 8 or 9 departments since January, 1955.

"Our people had watched a 20-ton crane with a similar rake used for the same purpose. The economy was soon evident of using instead an inexpensive 5-ton capacity crane which proves it has ample power for the operation.

"This hydraulic crane is well suited to handle pipe high overhead as well as in trenches or about the grounds. The crane raises space heaters and assists the men to replace roof sections damaged by acid fumes. It unloads steel beams,

bars and deck roofing from cars on the switch track or at the junction or from trucks at the platform. With its towing hook it pulls cars on both our long sidings and spots them where required. It unloads aluminum ingots from gondola cars and stacks them—a job for which we formerly rented a large crane for \$10.25 an hour.

"The precision of this hydraulic unit is particularly desirable in raising prefabricated or welded pipe arrangements into place in the plant.

"In construction and maintenance, the Austin-Western unit does an excellent job of pouring concrete as it comes out of the Redi-mix truck, and the pouring can just as well be two or three stories in the air."

For the complete story, ask for Gould Certified Report No. 5603.



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607 Farnsworth Avenue, Aurora, Illinois

Please send complete Gould Certified Report No. 5603

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Company

Street

City Zone State

PRODUCING AGGREGATES . . .

continued from page 126

rial thus obtained frequently is clean enough for use without additional washing.

Underground quarrying of rock is usually confined to limestone, and normal mining practices are followed. Rooms or chambers are excavated underground, with pillars left to hold up the roof. Tractors with clam 'dozers, front end loaders, and even shovels and trucks are employed to remove the material. So far not much use has

been made of underground conveyors because the rock to be removed is usually of rather large size.

No two operations in gravel pits nor any two in quarry installations are identical. There are too many natural variations in the raw materials to contend with and too many variations in aggregate specifications, or the problems involved in meeting specifications, to permit of definite conclusions regarding exact procedures to be followed.

Generally speaking, however,

gravel operations involve screening as the first step in the processing operations to remove excess sand and to size out acceptable materials before crushing.

In quarry operations, on the other hand, processing usually begins with a crushing operation, although the practice more recently has turned to scalping by screens to remove dirt. Quarried material often is broken to size by blasting and loading, and generally, too, primary crushers for quarry stone have larger openings to take bigger rock.

Today's specifications for aggregates are much stricter than those in effect even a few years ago. Extensive engineering tests and the experience gained during the last few years of high construction activity have led to new concepts and new ideas about what aggregates should be to give maximum strength and endurance at least possible cost.

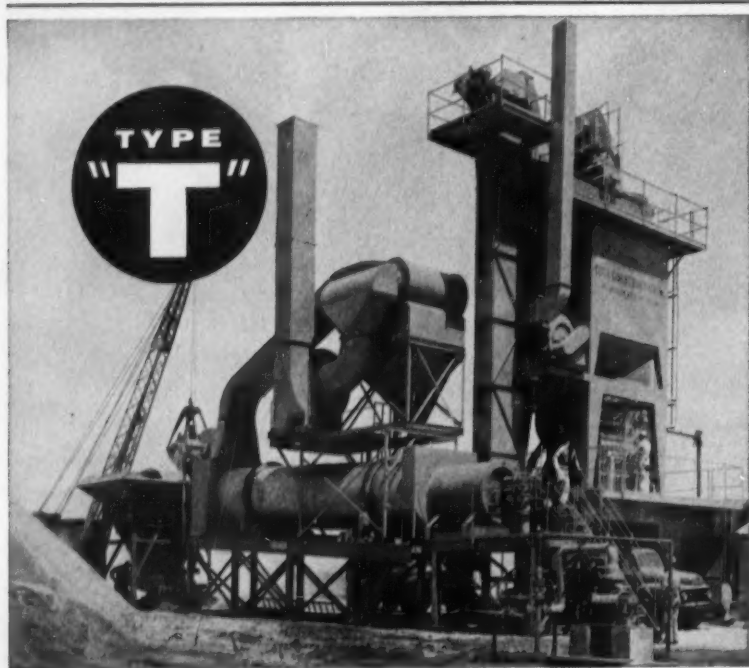
The work done by such organizations as the Portland Cement Association, Asphalt Institute, National Sand and Gravel Association, National Crushed Stone Association, Associated General Contractors, Bureau of Public Roads, American Society For Testing Materials, American Association of State Highway Officials, and various universities, state highway departments, government agencies, and others has resulted in new standards and new techniques that have raised the science of aggregates production to entirely new levels.

Manufacturers of machinery have done their bit by extending their engineering departments and engaging in research aimed at helping producers with specific problems. Today the engineers who write the job specifications and the manufacturers of the machinery to do the processing are working closer together than ever before in order that each can take advantage of the progress being made by the other.

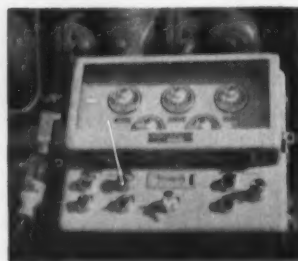
As a result of all this research and study, it is possible now to define more clearly the attributes various aggregates should have, and to set up the necessary procedures for determining how well the aggregates furnished to any job meet the quality standards prescribed by the specifications.

The most common tests to determine whether stone is suitable for use as construction aggregates are those for:

(Continued on page 133)



Now Available With Automatic Cycle Control



Automatic Cycle Control—now on all H & B Type "T" and Mobile asphalt plants.

H & B Type "T" batch type asphalt plants, also the new Mobile completely portable batch plants, are all now equipped with automatic cycle control. This equipment provides for automatic control of the entire mixing cycle, with no loss of time between runs. The operation, however, is still fully under control of the operator, and may be interrupted at any time or operated manually in the conventional manner.

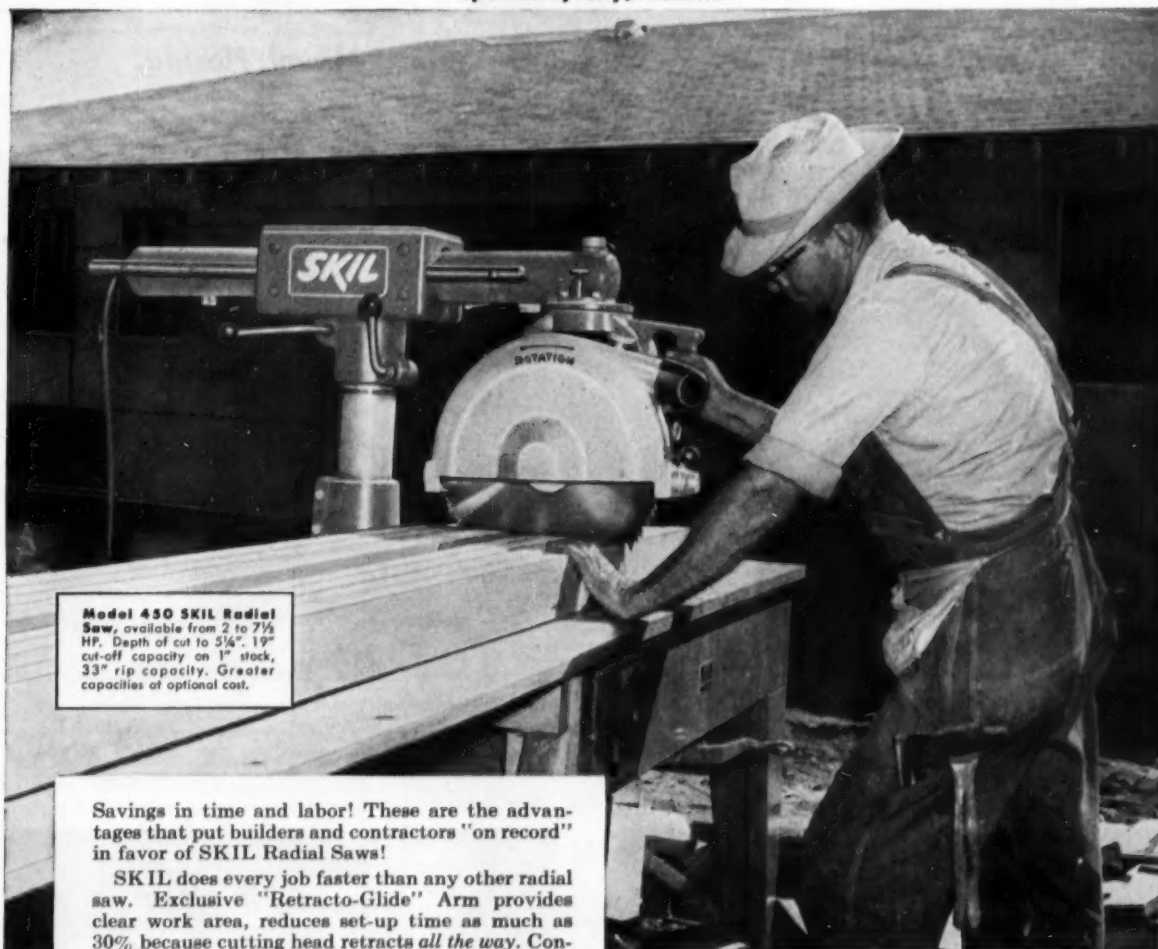
Automatic weighing is also available—as optional equipment—on both Type "T" and Mobile plants—in connection with the Fluidometer system and Automatic Cycle Control to make the entire mixer floor operation automatic.

Complete information about Automatic Cycle Control and completely automatic mixing and batching will be sent on request.

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"We Cut Labor Costs 50% with our SKIL Radial Saw"

Says Mr. V. K. Nelson, Home Builder
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Model 450 SKIL Radial Saw, available from 2 to 7½ HP. Depth of cut to 5¼". 19" cut-off capacity on 1" stock, 33" rip capacity. Greater capacities at optional cost.

Savings in time and labor! These are the advantages that put builders and contractors "on record" in favor of SKIL Radial Saws!

SKIL does every job faster than any other radial saw. Exclusive "Retracto-Glide" Arm provides clear work area, reduces set-up time as much as 30% because cutting head retracts *all the way*. Controls are within easy reach from operating position. Fewer time-wasting adjustments. Sets up quickly and easily for bevel, miter, compound and other cuts.

See how a SKIL Radial Saw can simplify material handling, reduce costs and increase output for you! Call your distributor today!

Look At These Stand-Out SKIL Advantages!

- **Clear Work Table!** Plenty of layout room, no blind spots, no "ducking" under overarm!
- **Greater Support!** Exclusive wide spacing of 8 grease-sealed ball bearings in supporting head!
- **Easy Cut Changeover!** Any angle cut may be set up in one quick step!
- **Router-Shaper Attachment** for 3 times faster routing and shaping!

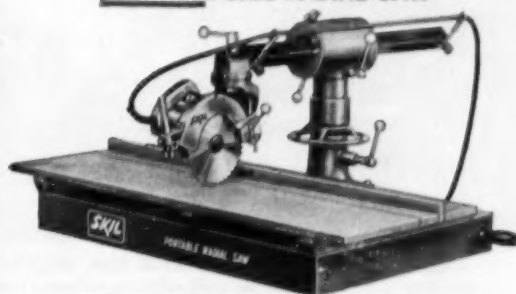
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SKIL Model 649 delivers 25% more power to blade than any other 1½ HP radial saw!

Lightweight, compact, goes directly to the job! Can be carried through doors for trim cutting after framing is completed. Peak power, plus 2½" depth of cut gives more value than any other radial saw in its class. Handles tough miters on 2 x 8's or larger!

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—says Kent Kelley of Kimco Concrete, Inc., Miami, Florida,
about his new GMC Hydra-Matic* tandems



TRIP TIME—AND DRIVER'S TIME—REALLY SHRANK when Kimco's new GMC Hydra-Matics went into service. Kelley reports: "I've driven one myself—over a highway with lights synchronized for 30 m.p.h. Starting off side-by-side with a competitive truck, I lost him—bogged down in all that shifting—within half a mile." Kimco's operating costs have shrunk, too—with no clutch troubles, no axle failures, no drive-shaft breaks—despite plenty of off-the-road work in thick sand and muck. And that's where Safety Power Steering—optional at extra cost—pays off.



HAULING 52,900 LBS. GROSS AT A CLIP, these GMC MW554's haul more mix per load within legal limits. That's due to the new weight-saving chassis design that eliminates every ounce of excess truck weight—yet makes these GMC's the ruggedest ever built. "You can't hurt those trucks," says Kelley.



"I GET MORE OF WHAT I WANT IN GMC's—no matter how you compare them with competition," Kelley claims. "There's more power from that 210 h.p. V8—better load capacity—easier driving—and all with much lower operating costs. I predict that most every truck in the country will be a Hydra-Matic within the next five years."

*Hydra-Matic standard on some models; optional at extra cost on others

GMC TRUCK & COACH—A General Motors Division

PRODUCING AGGREGATES . . .

continued from page 130

Hardness
toughness
soundness
resistance to abrasion
specific gravity
particle shape and fracture
fineness modulus
organic impurities
surface moisture
soft particles
gradation

Not all these tests are made at every installation. Often previous experience with the material in an area, quarry, or pit can be relied upon to assure that the aggregates will be satisfactory for certain jobs.

On road work involving fills or sub-base work, aggregates often need not be top quality. But when it comes to portland cement and bituminous concrete applications, specifications usually are quite strict. Materials must have the qualities that lead to maximum durability, and the only safe way to determine whether the material has these qualities is to test it in accordance with established procedures. The specific tests to be applied usually are prescribed by the materials engineer for the job.

Most specifications for concrete or bituminous pavements call for aggregates that consist of hard, durable particles of stone, free from an excess of flat, elongated, soft, or disintegrated pieces and of dirt or other objectionable matter. In addition the requirements for grading are specified.

The mineral aggregates most commonly used in bituminous construction are broken stone and slag, crushed and uncrushed gravel, sand, and mineral fillers such as portland cement and stone duct. To these may be added a variety of inert materials used when local conditions warrant. Fillers may include suitable soil, hydrated lime, and other finely divided inert materials.

These aggregates may be classified as:

1. Dense-graded
2. Open-graded
3. One-size

Dense-graded materials range from maximum size of more than 1 in. down to less than a No. 10 sieve with appreciable amounts of dust passing the No. 200 sieve. For any given density, the amount of dust required increases as the maximum size of the aggregate decreases. A well-graded aggregate, for instance, whose maximum size

is $\frac{3}{4}$ in. is considered to be dense-graded if it contains 5 to 15% dust, but a sand to be dense-graded might require 10 to 25% dust.

Open-graded materials may be poorly graded or they may differ from dense-graded materials only in the amount of dust they contain. For example, a well-graded material of 1 in. maximum size would be considered open-graded if it contained less than 5% of dust. Likewise, a sand containing less than 10% of dust would be considered open-graded.

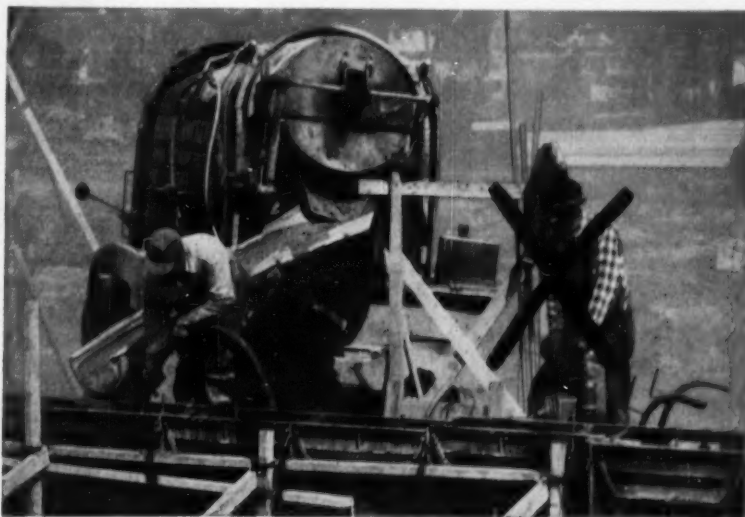
One-size materials are still more

open-graded. Because these materials must have high resistance to crushing, the quality requirements are more exacting than for those for dense or open-graded aggregates.

Tests applied to aggregates for bituminous construction vary with the class of work to be done. Among the tests specified are these:

1. *Specific gravity*—to determine the volume of voids, the density of mixture, and, in some cases, to set the mixture composition.

(Continued on page 138)



NEW MASTER "1-MAN" VIBRATOR CUTS VIBRATING COSTS IN HALF



Only 25 lbs. Easy to handle.

It weighs 25 pounds! It's all in one piece! It plugs into any regular 115 Volt AC or DC electric line . . . and with no heavy engine or motor to drag around, one man handles it easily.

The motor is sealed in the vibrating head, so there's no flexible shaft to get out of whack; no oiling or greasing problems; no kinking troubles.

No field maintenance is necessary: when motor head needs attention, snap it off and snap on a spare.

The vibration actually penetrates farther and leaves fewer voids in the concrete than old-style vibrators.

The price is low. The design has eliminated so much cost, and no special power source is required, but the big saving comes in use. Write for folder or ask your Master distributor for a free demonstration. You'll see exactly how the Master "1-Man" can cut your vibrating costs at least 50%.

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new TS-260



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for production

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to capacity With more than 18 horsepower for every yard of struck capacity, the new TS-260 has plenty of power to move full loads at full speed — under all conditions.

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to strength The TS-260 has the structural strength and balance to effectively utilize all of its horsepower . . . with extra capacity built into the clutch, transmission, final drives and drive axles . . . with a heavy, all-steel, box-type tractor frame . . . and with proper over-all weight distribution.

Motor Scraper



and profit on the job!

power-matched for speed The big Allis-Chalmers diesel engine provides high torque at both high and low engine speeds resulting in smooth shifting and fast acceleration. And with plenty of engine power, the TS-260 loads fast, hauls fast, dumps fast . . . moves big payloads at low cost, even under tough conditions.

power-matched for operating ease Overlapping gear speeds in all four gear ratios reduce gear shifting, speed work cycles. And with 90-degree steering for rapid maneuvering in close quarters, it's easy for the operator to get the most out of the TS-260.

*The new TS-260 gives you these four basic advantages . . .
and many important new features*

CHECK IT FROM EVERY ANGLE—



the New **TS-260** *is* **Designed for Low-Cost Dirt**

“Live action” hydraulics for sure control. Positive gear-driven pump provides constant live power for both steering and scraper operation. Full-flow filtering, cross relief valves and simple design make this an efficient, safe performer.

Positive 90-degree steering for close-quarter maneuverability. The steering wheel is direct-link connected to the steering valve. A 30-degree turn of steering wheel directs full pump flow to two double-acting steering jacks for fast, positive turns up to 90 degrees. For slower turning at high speeds, a slight turn of steering wheel provides a smooth, regulated response.

Double-safety brakes for positive stops. Big, four-wheel air brakes provide sure braking under full load at full speed . . . and an air reservoir system with emergency relay valve means positive braking safety.

“Boiling-action” loading for big payloads. Combination of curved bowl bottom and offset cutting edge provides a “boiling” action that eliminates voids . . . builds profitable, heaped loads.

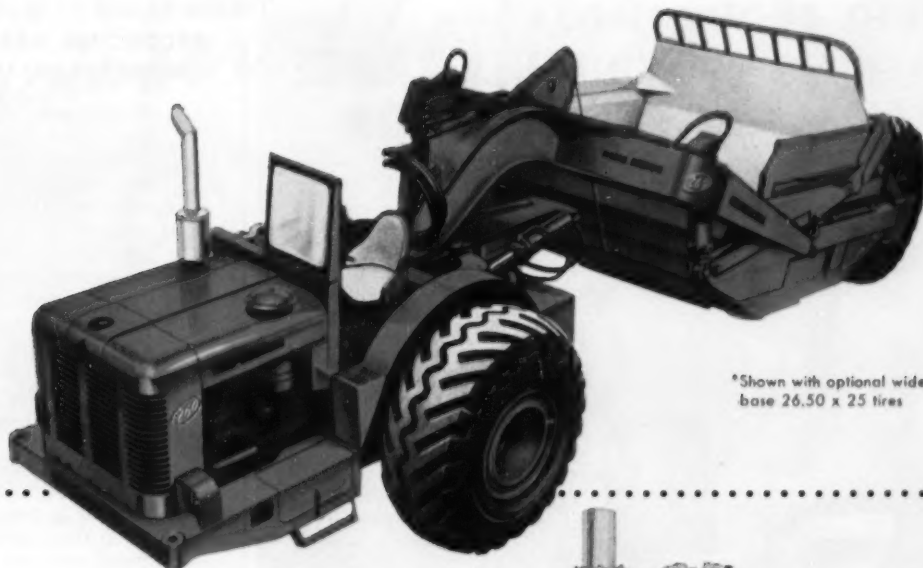
Quick, clean spreading with high apron and forced ejection. Patented linkage moves apron ahead and up when ejector goes forward . . . providing high apron lift and exceptionally large opening for clean, easy-to-control unloading.

Balanced weight distribution for maximum traction, long tire life. When empty, 66 percent of entire TS-260 weight is on front wheels—34 percent on rear wheels. When loaded, each wheel supports equal weight—providing excellent flotation and fast hauling.



Get all the Facts . . . NOW!

See your Allis-Chalmers dealer for full details on the new TS-260. Find out how this new motor scraper is power-matched for production and profit on the job.

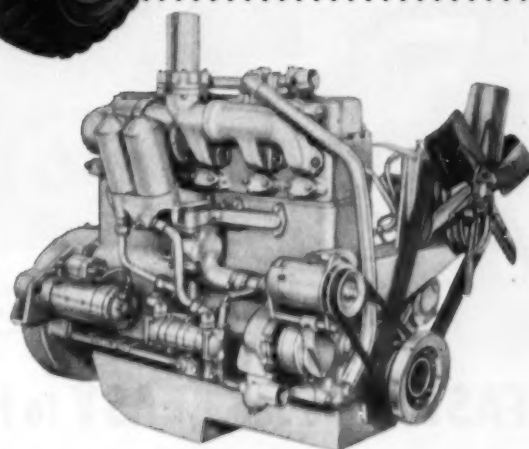


*Shown with optional wide-base 26.50 x 25 tires

Choice of tires to fit job conditions*. Standard 21.00 x 25 (20-ply) or optional wide base 26.50 x 25 (20-ply) tires provide a choice that insures carrying capacity and full flotation for steady going in all types of material.

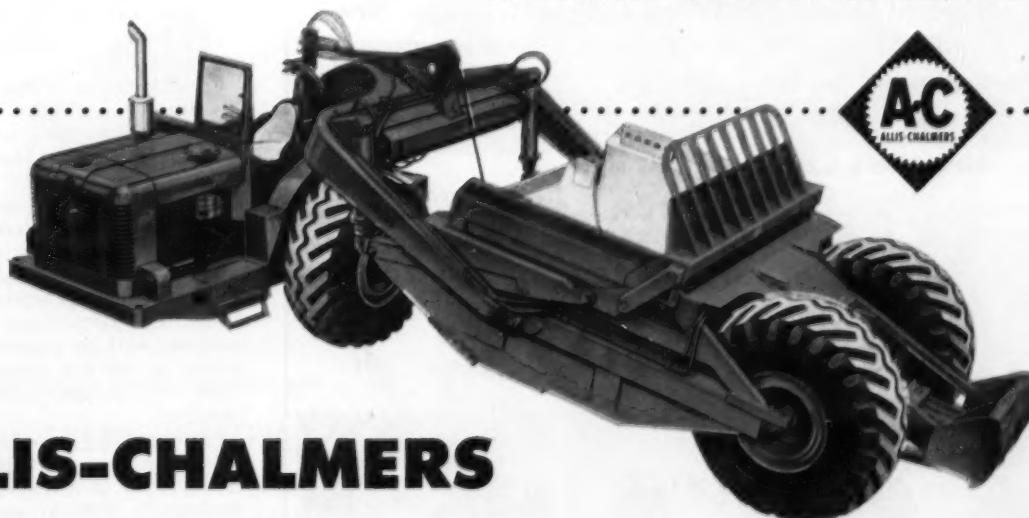
Big 200-horsepower Allis-Chalmers diesel engine. The 844-cubic-inch piston displacement and conservative 200-horsepower rating of this outstanding diesel engine provides plenty of reserve for low-cost operation under all conditions. "Follow-through" combustion results in sustained power, low peak pressures . . . smooth, steady performance.

New easy-shifting transmission. There's a correct gear ratio in the TS-260 transmission for every speed, every work condition. New clutch brake and gear overlap in all four speeds makes it easy to shift gears smoothly, maintain steady acceleration and full pulling power.




Heavy-duty power train. The TS-260 power train is designed to transmit high engine torque to the drive wheels with maximum efficiency. The engine, clutch and constant-mesh transmission are assembled as a unit to assure accurate alignment. Simplified removal of each individual component provides easy serviceability.

ALLIS-CHALMERS, CONSTRUCTION MACHINERY DIVISION, MILWAUKEE 1, WISCONSIN



ALLIS-CHALMERS



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VISION**

THE NEW UNIT
Challenger
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FAST on the Job...EASY to Handle!

Added to the UNIT line of proven equipment, is the New UNIT CHALLENGER. Here's a modern $\frac{3}{4}$ -yard machine that provides a perfect combination of design and construction. Packed with new advanced engineering features: Self-aligning Hook Shoes... Force Feed Lubrication... Full Floating Trunnion-Mounted Tapered Drums... Torque Converter, etc., the New UNIT CHALLENGER is the most dependable machine that money can buy.

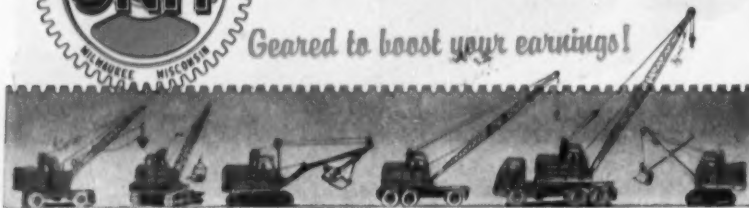
Bulletin C-800 completely describes and illustrates the New UNIT CHALLENGER.

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Gearred to boost your earnings!



A 8343-7/2

PRODUCING AGGREGATES ...

continued from page 133

2. *Weight per cubic foot*—again a measure of density.
3. *Sieve analysis*—to determine the percentages of the various specified particle sizes. This analysis is required for designing paving mixtures, determining the suitability of the materials, and controlling the uniformity of supply.
4. *Percentage of wear*—in effect a measure of resistance to abrasion. Usually this test is made in a Los Angeles Rattler machine, but the Deval method is sometimes used. Obviously, a low percentage of wear is desirable, especially on thin surface courses.
5. *Swell test*—to determine the amount of vertical swell that occurs in a compressed bituminous mixture in the presence of water.
6. *Stripping test*—to determine the relative adhesion of a bituminous film in the presence of moisture.

In rigid pavement construction the same general conditions as for bituminous construction prevail. However, since it has become increasingly evident that the workability of concrete mixtures is greatly influenced by the amount of fine material in the sand, the specifications in respect to fine aggregates usually are designed with this fact in mind. Specific requirements as to segregation are also important.

Because strength is an important factor in rigid pavement construction, the quality of aggregates is controlled by defining:

1. The nature and permissible amounts of deleterious matter.
2. Conditions governing durability.
3. Requirements for mortar strength and freedom from organic impurities.

As in the case of materials for bituminous construction, tests will include those for specific gravity, weight per cubic foot, sieve analysis, and percentage of wear. In addition, and particularly where the concrete will be exposed to frost action, a test for soundness (sodium sulfate test) likely will be required.

Occasionally, specifications for concrete aggregates will make reference to a term called "fineness modulus." This is an empirical factor, or index number, which is

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Stationary Plant working a slag pile producing railroad ballast.

The Austin-Western line includes Jaw Crushers and Roll Crushers in many sizes; plus matching Screens, Elevators, Conveyors and Bins.

Exclusive design features and high operating speeds increase crusher output. Continuous operation and minimum maintenance expense are assured by the skilled engineering and sound manufacturing that characterize every Austin-Western Crushing and Screening Plant.

Each plant is designed to solve a particular production problem. We would welcome the opportunity to discuss your problem.

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& Instrumentation • Hamilton • Loewy-Hydropress • Madsen •
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61E Portable Plant equipped with 10" x 24" Jaw Crusher, 24" Plate Feeder and 2' x 6' double-deck Screen.



201E Portable Plant equipped with 10" x 24" Jaw Crusher, 24" x 16" Roll Crusher and 3' x 10' Screen.

Stationary Plant producing 2 sizes of sand and 2 sizes of washed gravel.



PRODUCING AGGREGATES . . . continued

roughly proportional to the average size of particles in a given aggregate and is obtained by adding the total percentages of a sample of the aggregate retained on each of a specified series of U. S. standard sieves and dividing the sum by 100. The sieve sizes used are No. 100, No. 50, No. 30, No. 16, No. 8, No. 4, and $\frac{3}{8}$ in., $\frac{1}{2}$ in., $1\frac{1}{2}$ in., 3 in., and larger if necessary, increasing in the ratio of 2 to 1. Al-

though fineness modulus does not distinguish between a single size aggregate and a graded aggregate having the same average size, it is useful for record purposes and for controlling the uniformity of deliveries during construction. For example, some specifications require that the fineness modulus of fine aggregate shall not vary more than 0.2 either way from a predetermined value of material from

some one certain given source.

Other tests for concrete aggregate are checks for amount of silt (material passing a No. 200 sieve) and, as in the case of bituminous aggregates, determination of the percentage of voids.

Here are a few typical specifications for gradation of aggregates taken from standards published by the American Society for Testing Materials.

Specifications for Crushed Stone, Crushed Slag, and Gravel for Waterbound Macadam Base and Surface Courses—ASTM Designation D 694-55.

Sieve Number	Nominal Size (Sieves with Square Openings)	Amounts Finer Than Each Laboratory Sieve (Square Openings), Percent by Weight									
		4 in.	3½ in.	3 in.	2½ in.	2 in.	1½ in.	1 in.	¾ in.	½ in.	No. 4 No. 100 (4750- micron) (150- micron)
1	2½ to 3½ in.	100	90 to 100	25 to 60	0 to 15	0 to 5	0 to 5	0 to 5	0 to 5	0 to 5	0 to 5
2	2 to 2½ in.	100	90 to 100	20 to 60	0 to 15	0 to 5	0 to 5	0 to 5	0 to 5	0 to 5	0 to 5
3	1½ to 2 in.	100	90 to 100	10 to 50	0 to 15	0 to 5	0 to 5	0 to 5	0 to 5	0 to 5	0 to 5
10	No. 4 to No. 10	100	90 to 100	0 to 100	0 to 100	0 to 100	0 to 100	0 to 100	0 to 100	0 to 100	0 to 100

Specifications for Lightweight Aggregates for Structural Concrete — ASTM Designation C 330-53T

Size Designation	Percentages (by Weight) Passing Sieves Having Square Openings					
	1 in.	¾ in.	½ in.	¾ in.	No. 4 (4750- micron)	No. 10 (150- micron)
Fine Aggregate:						
No. 4 to 0	100	85 to 100	40 to 60	10 to 35	5 to 25	5 to 25
Coarse Aggregate:						
1 in. to No. 4	0 to 10	0 to 10	0 to 10	0 to 10	0 to 10	0 to 10
¾ in. to No. 4	0 to 10	0 to 10	0 to 10	0 to 10	0 to 10	0 to 10
½ in. to No. 4	0 to 10	0 to 10	0 to 10	0 to 10	0 to 10	0 to 10
¾ in. to No. 4	0 to 10	0 to 10	0 to 10	0 to 10	0 to 10	0 to 10
1 in. to No. 4	0 to 10	0 to 10	0 to 10	0 to 10	0 to 10	0 to 10
Combined Fine and Coarse Aggregate:						
¾ in. to 0	100	95 to 100	45 to 60	10 to 25	5 to 15	5 to 15
1 in. to 0	100	90 to 100	35 to 50	10 to 25	5 to 15	5 to 15

Tentative Specifications for Concrete Aggregates — ASTM Designation C 33-55T

Sieve Number	Nominal Size (Sieves with Square Openings)	Amounts Finer Than Each Laboratory Sieve (Square Openings), Percent by Weight									
		4 in.	3½ in.	3 in.	2½ in.	2 in.	1½ in.	1 in.	¾ in.	½ in.	No. 4 No. 10 (4750- micron) (150- micron)
1	2½ to 3½ in.	100	90 to 100	25 to 60	0 to 15	0 to 5	0 to 5	0 to 5	0 to 5	0 to 5	0 to 5
2	2 to 2½ in.	100	90 to 100	20 to 60	0 to 15	0 to 5	0 to 5	0 to 5	0 to 5	0 to 5	0 to 5
3	1½ to 2 in.	100	90 to 100	10 to 50	0 to 15	0 to 5	0 to 5	0 to 5	0 to 5	0 to 5	0 to 5
10	No. 4 to No. 10	100	90 to 100	0 to 100	0 to 100	0 to 100	0 to 100	0 to 100	0 to 100	0 to 100	0 to 100

There are, of course, other requirements stipulated in these specifications referring to other qualifications of the aggregates than just the gradation requirements. The contractor or producer will naturally be governed in his operations by the whole of

the particular set of specifications he has to meet.

Likewise, in the matter of the tests to be made on his product to assure its compliance, he will be guided by prescribed standards. Both specifications and testing procedures are available to him.

Specifications for Materials for Soil-Aggregate Subbase, Base, and Surface — ASTM Designation D 1241-55T

Sieve Size (Square Openings)	Percentage by Weight Passing Square Mesh Sieves					
	Type I			Type II		
	Gradation A	Gradation B	Gradation C	Gradation D	Gradation E	Gradation F
2-in.	100	100	100	100	100	100
1-in.	75 to 95	100	100	100	100	100
¾-in.	30 to 65	50 to 85	60 to 100	60 to 100	60 to 100	60 to 100
No. 4 (4750 micron)	25 to 55	30 to 60	35 to 65	40 to 70	40 to 100	40 to 100
No. 10 (150 micron)	15 to 40	20 to 45	25 to 50	30 to 50	40 to 100	50 to 100
No. 40 (425 micron)	0 to 20	15 to 30	25 to 40	30 to 50	40 to 100	50 to 100
No. 200 (75 micron)	2 to 6	5 to 10	5 to 15	10 to 25	0 to 20	0 to 25

Specifications for Fine Aggregate for Sheet Asphalt and Bituminous Concrete Pavements — ASTM Designation D 1073-54

Sieve Size	Amounts Finer Than Each Laboratory Sieve (Square Openings), Percent by Weight	
	Grading No. 1	Grading No. 2
¾-in.	100	100
No. 4 (4750-micron)	90 to 100	90 to 100
No. 8 (2360-micron)	70 to 100	60 to 100
No. 16 (1180-micron)	40 to 60	30 to 60
No. 30 (600-micron)	20 to 40	10 to 30
No. 50 (297-micron)	7 to 20	5 to 25
No. 100 (149-micron)	2 to 10	0 to 10
No. 200 (75-micron)	0 to 10	0 to 10

Specifications for Crushed Stone, Crushed Slag, and Gravel for Bituminous Concrete Base and Surface Courses — ASTM Designation D692-54

Sieve Number	Nominal Size (Sieves with Square Openings) 2½ in.	Amounts Finer Than Each Laboratory Sieve (Square Openings), Percent by Weight									
		2 in.	1½ in.	1 in.	¾ in.	½ in.	¼ in.	No. 4 (4750- micron)	No. 10 (2500- micron)	No. 100 (150- micron)	
1	2 to 3 in.	100	90 to 100	25 to 70	0 to 15	...	0 to 5	...	...	...
2	1½ to 2 in.	100	95 to 100	...	35 to 70	...	10 to 30	...	0 to 5	...	
4	1 to 1½ in.	100	90 to 100	20 to 55	0 to 15	...	0 to 5	...	...	...
10	No. 4 to No. 10	100	95 to 100	...	35 to 70	...	10 to 30	0 to 5	...	...
20	¾ in. to No. 4	...	100	95 to 100	...	25 to 60	...	0 to 10	0 to 5	...	
40	½ in. to No. 4	...	...	100	...	90 to 100	...	20 to 95	0 to 10	0 to 5
60	⅜ in. to No. 4	...	...	...	...	100	...	40 to 100	0 to 15	0 to 5
100	¼ in. to No. 4	...	...	...	...	...	100	90 to 100	5 to 95	0 to 100
200	No. 10 to No. 60	...	...	...	...	...	100	85 to 100	10 to 20	0 to 10

Most likely he will be requested to follow procedures established by the American Society for Testing Materials (ASTM) or the American Association of State Highway Officials (AASHTO). The two organizations agree on most points. (Continued on page 142)



A PCA "Engine-Take-Off" mixer truck—one of 42 IH FC-402-L Trucks with T. L. Smith Integral Mixers and Fuller 5-C-650 Transmissions.

FULLER Transmissions *all the way for*



"We've learned from experience that Fuller Transmissions are by far the most dependable we've ever used," says R. O. Lippi, Manager of San Francisco's Pacific Coast Aggregates, Inc. That's why PCA always specifies Fuller Transmissions on its new mobile equipment.

PCA, one of the largest and most successful aggregates producers in the country, operates 13 producing and 18 batching plants in Northern Cali-

fornia; is a wholesale distributor of building materials.

Fuller 5-C-650 Transmissions are used in PCA's entire fleet of 42 new International "E.T.O." trucks... the unique and highly practical "Engine Take-Off" mixer trucks that eliminate the mixer engine and make it possible to carry 6½ cu. yd. payloads within California state weight laws.

Its fleet of 16 diesel powered Wooldridge Terra Cobra wagons, used in the harvesting operation to produce rock, sand and gravel, is equipped with 200 hp HBIS Cummins engines and Fuller 4-speed 4-A-112

heavy-duty transmissions.

In addition, the entire PCA fleet of 200 trucks is equipped throughout with dependable Fuller heavy-duty transmissions.

On job after job, where loads are the biggest and the going is the toughest, you'll find Fuller Transmissions putting horsepower to work efficiently. Next time you order heavy-duty construction equipment, specify Fuller Transmissions.

From over 110 models available for rubber-tired equipment, you will find a Fuller Transmission designed to do *your* job.

One of PCA's fleet of Wooldridge Terra Cobra wagons equipped with Fuller 4-speed 4-A-112 Transmissions.



FULLER MANUFACTURING COMPANY
Transmission Division, Kalamazoo, Michigan

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HOW TO HANDLE WET JOBS

#34 of a Series

IS THIS A RECORD FOR DEWATERING SILTY SAND & CLAY?

Concrete box culvert, Old Bridge, N. J.
Contractor: Almeida Construction Co.



PHOTO, JUNE 1—Griffin equipment shipped that day. Difficult swampy soil required use of specially designed sand filters around the wellpoints.



JUNE 4. Wellpoint system installed over weekend and excavation well under way. Actually, the 5 ft of water was under control just 20 minutes after pumping started.

That's how skillfully the filters were designed. P. S. Almeida called Griffin on the recommendation of a contractor friend. Ask your friends about Griffin.

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Toronto Montreal Halifax

PRODUCING AGGREGATES . . . continued from page 140

Any aggregates producer can obtain the information he needs regarding test procedures by writing either of these associations. Incidentally, ASTM in March, 1956, published a new book of ASTM Standards on Mineral Aggregates and Concrete, with Selected Highway Materials. It is available at a

list price of \$3.75 from ASTM at 1916 Race Street, Philadelphia, Pa.

The address of AASHTO is 917 National Press Building, Washington 4, D. C.

As a handy reference here is a brief outline of some of the tests used to determine the physical properties of rock.

Tests for Physical Properties

TOUGHNESS TEST

1. Sample—cylinder 25mm high and 25mm in dia.
2. Steel plunger with spherical lower end resting on sample is subject to impact of a 2 kg hammer. The energy of the blow is stepped up by increasing the height of fall of the hammer 1 cm after each blow.
3. The height of fall in centimeters at failure of the specimen is called toughness. H (in cm) = Toughness.

DORRY HARDNESS TEST

1. Sample—a cylindrical rock core 25 mm in dia from the rock specimen.
2. Sample is subjected to the abrasive action of quartz sand fed upon a revolving steel disk.
3. The end of the sample is worn away in inverse ratio to its hardness. The amount of loss is expressed in the form of a coefficient as follows: Coefficient of hardness = $20 - \frac{W}{3}$
 W = loss of weight after 1,000 rpm of disk.

LOS ANGELES ABRASION TEST

1. Size of sample—5,000 g of clean, dry aggregate properly graded (A).
2. Sample placed in machine which is rotated for 500 revolutions at 30 to 33 rpm.
3. Aggregate then removed and screened on a No. 12 sieve. Material retained on screen then washed, dried, and weighed (B).
4. Percentage of wear = $\frac{A - B}{A}$
The lower the Los Angeles rating, the harder the rock.

DEVAL ABRASION TEST

1. Sample—about 50 pieces broken by hand from a large piece of rock wt. 5,000 grams.
2. Sample placed in large cylinder mounted at an angle of 30 deg with the axis of rotation so that the rock charge is thrown from end to end twice during each of 10,000 revolutions.
3. Charge then screened over No. 12 sieve and the amount passing is expressed as a percentage of the initial weight and is called the percent of wear.
4. French coefficient of wear = $\frac{40}{\% \text{ of wear}}$

COMPRESSIVE STRENGTH

1. Sample—cylinder of rock 2 in. high and 2 in. in dia.
2. Cylinder of rock is placed between a special bearing block and the head of a suitable universal testing machine.
3. Unit crushing strength is calculated in psi.

SPECIFIC GRAVITY TEST

1. Size of sample—5 kg of plus $\frac{3}{8}$ -in. aggregate.
2. Wash to remove dust, then dry at 110 C temp.
3. Immerse in water for 24 hr and then weigh (B).
4. Determine weight of sample in water (C).
5. Dry again at 110 C temp and weigh (A).
6. Bulk specific gravity = $\frac{A}{B - C}$
7. Apparent specific gravity = $\frac{A}{A - C}$

ABSORPTION TEST

- 1, 2, 3, 4, 5, and 6. Same as above.
7. Absorption, percent = $B - \frac{A \times 100}{A}$

The second article on Producing Aggregates will appear in September



COMMUNITY CAMPAIGNS

Give... the United way



Here's a trench digger, backfiller, and compactor in one neat package, on a New Jersey water-company job. Truck arrangement provides transportation for men and tools. Compact 23 by 82 in. Le Roi 105 Utility compressor powers Le Roi-Cleveland breakers and tampers. Le Roi-Cleveland triple tamper in foreground features adjustable-height handle bar for greatest operating ease. It can replace five single tampers. Most important, when tamping, it stays close to the ground, making dangerous high lifts unnecessary.

Work-Saving Air-Tool Applications

by LE ROI



Gas company employee breaks through tough 12-in. concrete. To speed emergency repair work, this utility chose the maximum shattering impact of a Le Roi-Cleveland 52 paving breaker. Work speed, however, was only one consideration. Low-cost operation was important too. The 52's piston air-cushion reduces internal part wear, makes handling easier.

Highway construction in Mexico is frequently for the birds, or literally could be as this picture indicates. Two operators pictured on this treacherous perch rely on easy-handling Le Roi-Cleveland sinkers, as do 38 others on job. To complicate the fatigue problem, this area around Chilpancingo is often subject to extreme heat. Sealed dust-proof feature is one reason why these tools produce the powerful, constant rotation needed for fast drilling.

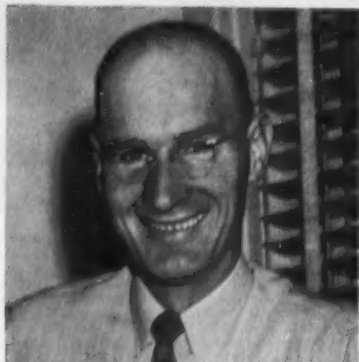
On this \$1,600,000 Cleveland sewer job, Le Roi-Cleveland clay diggers set a daily 20-ft. pace. The C-10 clay spade was chosen because a great deal of handling and lifting were required. Operators appreciated a well-balanced tool for this rush job. The spade also is free from bumps, so that operators can get a firm grip and still work close to tunnel walls.



LE ROI Division of Westinghouse Air Brake Co., Milwaukee 1, Wisconsin, manufacturers of Cleveland air tools, Tractair, portable and stationary air compressors, and heavy-duty industrial engines. Write us for information on any of these products.

Construction Men in the News . . .

M-K Names Anderson Project Manager



O'DEAN ANDERSON will be project manager on Morrison-Knudsen Co.'s \$45 million fill job to replace trestle over Great Salt Lake, Utah, for the Southern Pacific Railroad. The 39-yr-old Anderson has been for the past four years assistant chief engineer at the firm's headquarters in Boise, Idaho. He was the youngest man M-K ever named to that post.

Anderson took his B.S. in Civil Engineering at Utah State Agricultural College. Upon graduation he accepted a job as a Bureau of Reclamation rodman on Pine View Dam being built by M-K and Utah Construction Co. near Ogden. In less than six months, he went to the Bureau's Deer Creek project at Provo, as a junior engineer.

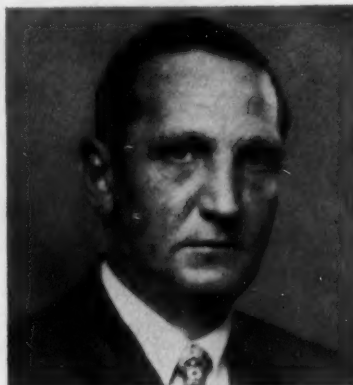
He resigned from the Bureau in 1939 and took a teaching fellowship at California Institute of Technology where he taught hydraulics and fluid mechanics and got his M.E. degree.

Anderson then joined Contractor, Pacific Naval Air Bases, a group of eight companies fortifying the nation's Pacific outposts. At Pearl Harbor headquarters he was assigned to his first M-K job—structural design and materials expediting for the Wake Island Air-base.

When Wake Island fell in June, 1942, Anderson returned to the U.S. and was assigned to Tooele, Utah, where M-K and associates were building concrete munitions igloos for the Corps of Engineers.

He later became successively an estimating engineer in the Los Angeles district office, project engineer at Fairfield-Suisan (now Travis) Air Force Base, and project manager on the construction of tank farms for underground storage of atomic materials at Richland, Wash.

In 1950 he ran one of M-K's toughest jobs: grading a new route for a railroad's main line around McNary Dam's future reservoir. He was working on the North African air bases when he was named assistant chief engineer.



Boston office by MC&S late last year (CM&E, Dec. 1955, P. 145), Richardson was for three years vice-president in charge of the company's New York marine and heavy construction division. He had been with MC&S for 21 years.



JAMES D. ST. CLAIR is the new executive secretary of the Concrete Contractors' Association of Greater Chicago. He will direct the activities of the 300-member organization. He previously was an engineer for the Cook County, Ill., Highway Department.

CHARLES F. WOODS is the new general manager of Merritt-Chapman & Scott Corp.'s construction department derrick division. Woods succeeds Capt. George W. Tooker who is retiring after 49 years continuous service with MC&S.

Woods has been associated with marine and towing operations since his college days. He joined the company in 1954 after five years as general manager of the Quaker Shipyard and Machine Co., Camden, N. J.



RUSSEL S. BODWELL, formerly with Porter, Urquhart, McCreary & O'Brien of Newark, N. J., joins Union Building & Construction Corp., Passaic, N. J., as assistant chief engineer. Bodwell was with

Porter for nine years. For a part of that time he was project manager on the New Jersey and Connecticut Turnpikes. He served two years with the Air Force during World War II, was shot down over occupied Europe, but escaped capture to return to his unit. He is a graduate of the University of Maine.

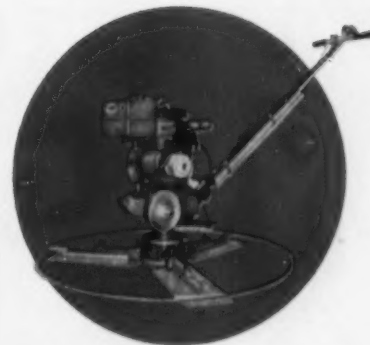
CHARLES A. RICHARDSON is new vice president and general manager of the Bay State Dredging & Contracting Co., marine division of B. Perini & Sons, Inc., Framingham, Mass. general contractors. Richardson previously was vice president of Merritt-Chapman & Scott's Boston area construction department office.

Before being appointed to the

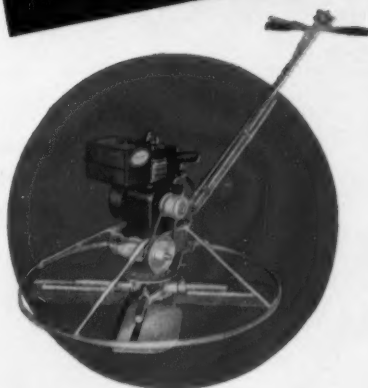
WHICH Whiteman FINISHER IS BEST for YOU?



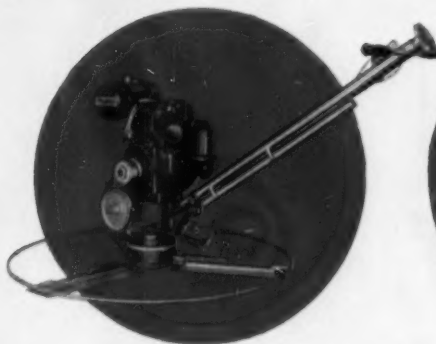
MODEL M — Small, compact for light construction. 29" dia. Combination trowels for floating and finishing.



MODEL J-1 — Medium machine for general use. 34" dia. Float trowels snap on in seconds. Largest selling model.



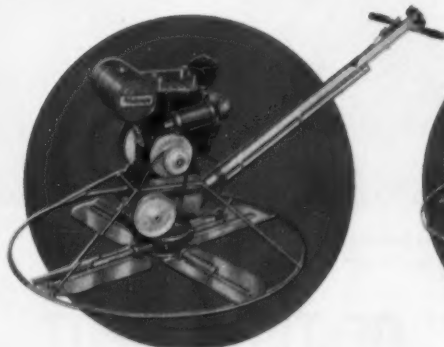
MODEL JA-4 — For average size jobs. Four trowel design. 34" dia. Combination floating-finishing trowels. Fixed ring.



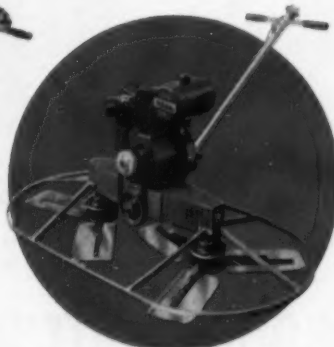
MODEL B-1 — Suitable for large areas. 44" dia. Snap-on float trowels. Rugged, dependable.



DISC FLOAT for dry mix and patented method slabs. Grinding attachments available.



MODEL C-4 — Large, heavy duty. 46" dia. Four combination trowels for floating or finishing. Fixed ring.



TWIN Finishes a full 5' width. Does the work of more than two machines. Combination floating-finishing trowels. Fixed ring.

Most models available with gas engines or electric motor drive.

WHITEMAN TROWELS WEAR 4 TIMES LONGER

Made of especially engineered, extremely hard, durable tool steel, Whiteman trowels give 4 times the service of ordinary trowels—produce a smoother better slab. Insist on genuine Whiteman trowels!

More Whiteman Finishing Machines are in use than all other makes combined!

Only Whiteman builds a **complete** line of concrete finishing machines... each specifically designed for a particular need... each incorporating superior Whiteman engineering based on 16 years experience—plus the exclusive features and rugged construction that have made Whiteman the undisputed leader. Ask your Whiteman distributor to show you the model that is best for you.

ROTATING OR FIXED RING?

During the past 16 years, Whiteman has made and thoroughly tested both rotating and stationary-ring machines and currently builds both types. Each has certain advantages and will finish equally close to walls, columns, etc. Consult your Whiteman dealer about the type best suited for your needs.

Whiteman

THE LEADER
IN CONCRETE
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TRUCK MIXERS



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BUILDING MACHINES



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Please send prices, catalogs and name of distributor for

☐ Power Buggies ☐ Screeding Machines ☐ Vibrators

☐ Floating-Finishing Machines ☐ Truck Mixers.

Name _____

Firm _____

Address _____

City _____ Zone _____ State _____



BOOMED WAY OUT because there's no room to swing and dump, this big American 700 Series Crawler Crane

dumps every load straight ahead—an operation that demonstrates high speed and accurate performance!

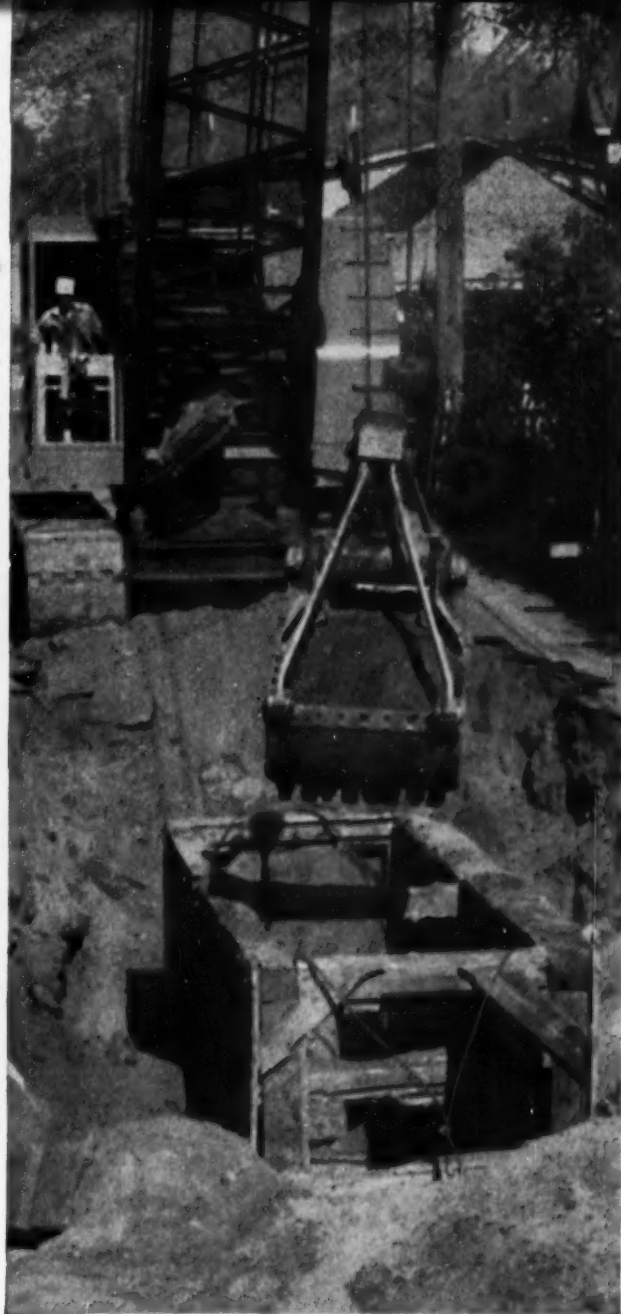
CONTRACTOR "BOOMS OUT" OF TIGHT SPOT

American's 700 Maintains Pace in Narrow Alley

Power boom lowering of their American 700 Series Crane played a big part in the successful completion of a storm sewer project by Thornton Bros. Company in St. Paul. The job was only 16 feet down, but ran through narrow alleys bordered by buildings, garages and fences—it was topped by high voltage lines! Because of these obstacles, the operator could not swing the crane to dump on either side. In this situation, the dragline bucket—used in the initial cut—was cast out to dump beyond the immediate working area. When clamshelling inside a shoring

box to the final grade, the crane operator had to boom every load way out, lowering the boom almost flat to clear the working area!

The American's power boom lowering provides high speed boom raising and controlled lowering speed right along with normal crane operations. This optional American feature, available at extra cost, speeded up the clamshelling on this job because the operator could swing the boom at the same time he lowered or raised it—a big time saver when spotting the bucket over the small shoring box.



HAIRLINE ACCURACY of American's air controls makes it possible for the operator to drop the clamshell through the box opening without delays or juggling! Pulling up the loaded bucket, booming out and dumping is also speeded up by the air control system.

"MORE CRANE FOR YOUR MONEY"—that's the benefit of American design and manufacture. Years of experience in the crane field have given American engineers job-proved basic theories that mean long crane life, safe operation and a performance efficiency that's unequalled! It's the big crane experience that puts big crane design in every American sold today.



"WITH THE AMERICAN'S POWER BOOM I can swing the load at the same time I'm booming up or down. It saves a lot of time in a spot like this!" So says Eddie Charpentier, who has "run them all" in the past 23 years. "The American's air controls are fast, accurate—the best I've ever handled . . . and it's the easiest machine I've ever operated," he added.

THE ROUGH SPOTS in any job are smoothed out by American's advanced design. You get a machine that can do every job more efficiently—faster. And, American's complete line—that starts with the rugged $\frac{1}{2}$ -yard 100 Series (right)—offers you a machine size exactly right for the job at hand. Your American Distributor will give you a rundown on the whole line of American rubber and Crawler mounted cranes. See him soon!



AMERICAN HOIST
and Derrick Company
St. Paul 1, Minnesota

Built to take it!



**10 SPEEDS FORWARD
WITH TA**

...The NEW INTERNATIONAL 300 UTILITY TRACTOR

Up to 1,000 pounds more built-in weight for push and pull-power keeps you moving dirt where lighter weight tractors slip and stall. With optional Torque Amplifier drive you get *two* speeds in each gear—you boost pull-power up to 45 per cent

on the go without touching clutch, throttle or gear shift!

We will demonstrate on your job—see WHY the new International 300 Utility *outworks them all!* Call today to arrange time and place.

See you at the
ROAD SHOW
CHICAGO
Jan. 28-
Feb. 2, 1957



International[®] Construction Equipment

International Harvester Company, 180 North Michigan Avenue, Chicago 1, Illinois
A COMPLETE POWER PACKAGE INCLUDING: Crawler, Wheel, and Pipe-Boom Tractors ... Self-Propelled Scrapers and Bottom-Dumps ... Tractor and Rubber-Tired Loaders ... Off-Highway Trucks ... Diesel and Carbureted Engines ... Motor Trucks.

The Maintenance Shop . . .



Proper Care Of Radiator Increases Engine Life

MODERN ENGINES have high compression ratios, increased engine speeds, and reduced bearing and piston tolerances, but the size and capacity of cooling systems have not been increased.

Instead of enlarging the cooling system as engines become more powerful, radiator manufacturers have exposed greater amounts of radiator surface, agitated air to hasten heat transfer, and incorporated other design changes that enable a cooling system to do its job more efficiently.

These changes have matched increases in engine horsepower. But they also have complicated the cooling system, making it a much more critical part of the engine than it was in the past. The radiator is actually the engine's thermometer. Unless the temperature of the coolant remains about normal, the engine is in danger of serious damage. For this reason

COOLING SYSTEM TROUBLE SHOOTING CHART

When Water Temperature is Above Normal, check:

Radiator Tubes • Hot or cold spots on core mean flushing is needed.

Pump • Worn or eroded impeller will hinder water flow.

Thermostat • If dirty, it can stick in open position. Replace.

Hose • Collapsed or eroded hose will clog water passages.

Fan • Loose belt, bent or greasy blades decrease efficiency.

Shroud • One-third of fan blade thickness should extend outside shroud.

When Water Temperature is Below Normal, Check:

Air Flow • Wide-open shutters

may admit too much air.

Thermostat • Replace if stuck in closed position.

If System is Losing Water, Check:

Leaks • Inspect core, hose connections, drain cocks, and pipe plugs.

Pressure Cap • Rating may be too low, or it may be stuck in open position.

Pump • Packing gland may be loose.

Engine block • Check for internal cracks in head or block.

Cylinder head gasket • Water passages and gaskets must be sealed perfectly.

proper maintenance of the cooling system of a modern engine takes on added importance.

The three principle sources of cooling system failures are impurities in the coolant that build up and clog water passages; water loss through leaks in hose lines, at the pump, or at the cylinder gaskets; and aeration that produces oxygen, the essential factor in the process of corrosion.

According to the Young Radiator Co., a leading producer of heavy-duty cooling systems, water almost always needs some form of treatment before it is suitable as a cooling system fluid for today's high compression engines.

Depending on its source, water usually contains varying quantities of hydrogen sulphide (identified by its "rotten egg" odor), carbon dioxide, and other gases, as well as dust and suspended foreign matter, all of which constitute corrosive forces.

Unless water is proved "soft" by analysis, steps must be taken to remove these impurities. This can be done with distillation equipment, by condensing live steam, or by equipping the engine with a chemical exchange unit.

The Perry cooling system filter and conditioner, an electro-chemical unit, is growing in popularity because it is easy to install and service. Working in much the same manner as an oil filter, the Perry

unit mechanically removes foreign matter, softens the coolant, and acts as a chemical rust inhibitor.

Even when steps are taken to soften water, it is probable that it will still contain corrosive elements. Because this is true, inhibitors generally are necessary. There are many types of cleaners available, but water soluble inhibitors with a softening agent are the best for engines that power mobile equipment, according to Young. Other types, such as zinc pencil and oil soluble inhibitors, have shortcomings that make them only partially effective, and then only under ideal operating conditions. Some inhibitors demulsify and form a gummy substance that accumulates the foreign matter that remains in the coolant.

Sticky deposits that build up and clog water passages often are helped along by outside factors. Probably the worst offender is the mechanic who "thoughtfully" sees that the water pump is "adequately" greased and oiled. He will take the grease gun and force a quantity of grease into the pump bearing. When he does this, the grease naturally works its way into the pump and mixes with the water. It can be found later at the top of the radiator core or within radiator tubes where it mixes with iron oxides to plug water passages.

Mileage, operating conditions, engine rpm, the coolant source,

MAINTENANCE SHOP...

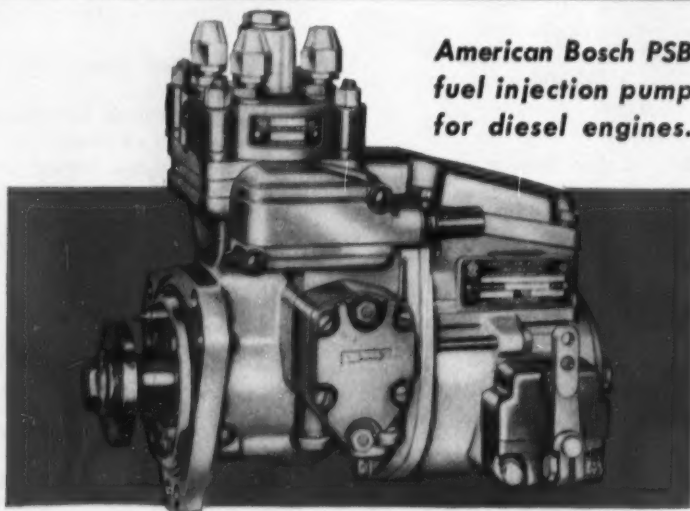
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and even atmospheric conditions have a bearing on the proper interval between radiator cleanings. On trucks, tractors, and stationary power units that operate day after day under rugged conditions, the radiator should be flushed as often as possible and at least every three months.

A good acid-type cleaner that does not affect rubber is the safest and most effective. To flush a radiator properly, the hose connecting

the radiator with the engine block and pump should be removed, and the radiator and engine block should be flushed separately. The radiator should be flushed with the water entering at the bottom connection, and the engine block should be flushed from the top. This reverses the normal flow pattern.

Thermostats, of course, must be removed before the system is flushed. This provides a good opportunity to check the thermostats by submerging them in water of known temperature.



**American Bosch PSB
fuel injection pump
for diesel engines.**

Unmatched for service and performance...

That's the record of more than 100,000 American Bosch PSB fuel injection pumps now in service—some for as long as five years. The PSB has many features—simple rugged construction, fewer parts, accurate fuel metering and distribution, positive governor control. Easily replaceable hydraulic head permits quick field servicing. All combine to assure top engine performance and economy of operation, long trouble-free life and low maintenance expense.

Every American Bosch fuel injection product is backed by an established and growing system of authorized service agencies, fully equipped and staffed with trained personnel to provide quick, efficient repair service.



AMERICAN BOSCH

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Springfield 7, Mass., U. S. A.

4096

Aeration is just as harmful to the cooling system as foreign matter in the coolant. Since oxygen is necessary to start corrosion, a continued supply of air from outside the system must be prevented.

On modern cooling systems, aeration control is more difficult because pump-type water circulation has replaced thermosiphon-type circulation. The water pump controls forced water circulation that increases heat transfer at the core, but it also speeds up corrosion because air may be pumped into the system.

The main sources of air are at the pump and at the hose connections. The water pump packing must be kept tight, and leaking pumps must be repaired immediately because even a small leak is enough to pass large quantities of air that will accelerate corrosion.

Besides oxygen, there are other gases that aid the corrosive process. One is exhaust gas that leaks into water jackets through loose gaskets. Unless a perfect seal is maintained between the cylinder gasket and the water passage, the coolant may become contaminated with carbolic, nitric, or sulphuric acid, all of which support electrolytic corrosion. This affects a cooling system the same way battery acid affects cells of a storage battery.

Not all cooling system failures are caused by internal difficulties, of course. Fan blades may be bent or dirty; the air flow may become obstructed; water may leak from drain cocks, pipe plugs, or the cylinder head gasket.

Fan blades must be cleaned periodically because they accumulate dirt and grime that increase horsepower consumption and cause vibration that throws the fan out of balance. The location of the fan in the radiator fan shroud is also important. When fans are the exhaustor or sucker type—found most often on automotive systems—the fan blades should be placed so that two-thirds of the thickness is within the shroud. The fan will not be fully effective if the blades are entirely within the shroud or if they extend too far outside.

Today's cooling systems are designed to keep pace with the modern engine—but it is obvious that they are much more susceptible to failure than they were previously. Smart contractors realize this fact and have placed increased importance on cooling system maintenance. They find it pays off with longer, trouble-free engine life.

**C & D
Movall**

What's so special about the Movall?



Hauling granite rock, normally considered an end-dump job, is easy for Movall Rock-Wagon.



Spreading the load (something you can't do with a bottom-dump) is easy with Movall because load dumps behind rear wheels, and you control depth of spread (3" to 18") by speed of tractor.

1. Positive ejection
2. Does work of both an end-dump and a bottom-dump
3. Can spread "on the fly," like a scraper
4. Handles any top-loaded material

Why tie up money in single-purpose end-dumps or bottom-dumps when Movall Rock-Wagons do the work of both—and give you the further advantages of spreading and positive ejection? Movall's unique design (see diagram below) pushes out rock, dirt, mud, gumbo, frozen earth or ore—any material you can top load.

If you now own rubber-tired tractors (2 or 4-wheel, any make, any size) and scrapers, simply interchange Movalls for scrapers and you're equipped for any top loading job regardless of material, or how and where you want to dump it.

Want more information about the unique positive-ejection Movall Rock-Wagon? See your tractor dealer, or mail coupon NOW. C & D Division, Yuba Manufacturing Company, 701 East H St., Benicia, Calif. Phone: 628.

Fill in, Mail TODAY

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I'd like ☐ Try-and-buy demonstration of Movall.
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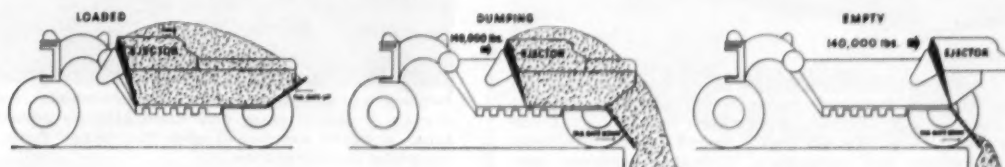
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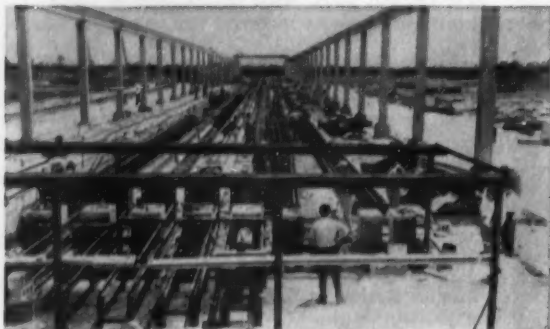
— 10 — HOW IT WORKS



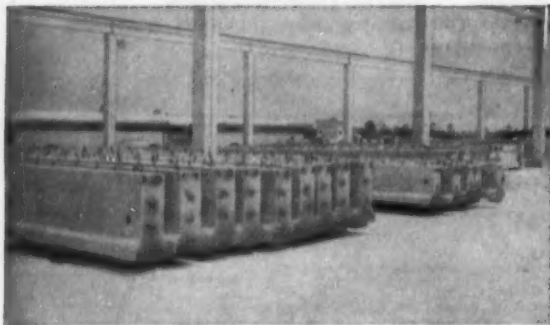
WANTED: 300,000 BRIDGES!



New thirteen-year, multi-billion OPENS VAST NEW MARKET FOR



Typical casting bed where structurals are prestressed and cast. The operation is continuous and turns out prefabricated structural members in hours instead of weeks.



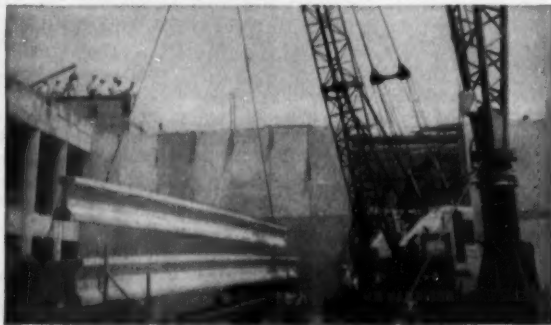
Prestressed beams ready for transportation by truck, rail or barge. The size of prestressed concrete members which can be cast in permanent site beds is limited only by transportation facilities and regulations. In on-site operations, prestressed girder spans up to 312 feet have been cast.

"Big" takes on a new dimension when applied to the National Highway Program. 40,000 miles of roads. 500,000 jobs. 32½ billion dollars. And about 300,000 new bridges, most of which can be built much faster and more economically with prestressed concrete than with any competitive building material.

It's history's **biggest** order for bridges. A giant demand for present makers of prestressed concrete. And a tremendous opportunity for those who decide to go into the business now.

For prestressed concrete construction answers this bridge need as nothing else can. In high degree of strength and permanence. Speed of construction. Savings in time and money. More profit for suppliers and constructors—greater value for taxpayers.

Bridges and highway slabs are just two of many uses where concrete prestressed with Union Tufwire



Hoisting a long beam for quick setting in position. Speed of construction is one of many prestressed concrete advantages. Time saved is money saved—and after construction there are further economies in maintenance.

SEE YOU AT
ROAD SHOW
IN JANUARY

dollar highway program PRESTRESSED CONCRETE MAKERS

strand and wire is proving its structural and economic advantages. Others range from fence posts to complete buildings and warehouses. Almost anything that concrete will do—it will do better when prestressed with Union Tufwire.

UNION Tufwire...


Tendon of Strength in Prestressed Concrete

Union Wire Rope Corporation is geared to the needs of the vast national highway program. Just as we've kept in step with the seven-league strides of prestressed concrete construction since the trend shaped up ten years ago.

Union Tufwire strand and wire is being supplied with on-schedule efficiency to such jobs as the Lake Pontchartrain causeway (longest highway bridge in the world; pretensioned with 3,700 tons of Tufwire strand.) Tufwire is being delivered just as promptly to a rapidly growing list of other customers, large and small. Our expanding plant capacity and Mid-America location assure you that sort of service—today and in the future.

If you're now in the business of making prestressed concrete let our engineering department and research laboratory give you and your consulting engineers a lift with any prestressing problem.

If you're among those who see the big opportunity opening up for new makers of prestressed concrete, let us help you explore the possibilities. It may well be the most important decision you ever made!

union  **Wire Rope corporation**

Specialists in high carbon wire, wire rope, braided wire fabric, stress-relieved wire and strand
2174 Manchester Avenue, Kansas City 26, Missouri



Finished section of the 24-mile bridge which is spanning Lake Pontchartrain (near New Orleans) in record time. Each slab in this colossal causeway is reinforced with 175 Union Tufwire strands.

union
Tufwire

**Stress-Relieved
Wire & Strand**



COST LESS!



White vibrators cost less to buy, cost less to maintain HERE'S WHY:

... completely interchangeable drives and heads, no special couplings required, less spares needed for maintenance.

... heavier eccentric rotors in vibrator heads for better performance in concrete.

... power units, either gasoline engine or electric motor, interchangeable.

... vibrator heads, from 1 1/4" to 3", and grinding heads interchangeable.

... replacement drive shafts cost less.

White MANUFACTURING COMPANY

ELKHART 6, INDIANA



MODEL M-9
with 2 HP
Lauson engine,
automatic clutch.

MODEL ME-13,
with 2 1/2 HP
electric motor
110 V. AC or DC.



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PLUS GAS MILEAGE CALCULATOR
on reverse side

- instantly tells you correct inflation for any load
- covers over 40 truck tire sizes
- helps you add thousands of miles of use to your tires
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Over 15,000 of the nation's leading fleet operators save up to 20% on tires with our DIRECT-FROM-FACTORY buying plan. Premium-quality, factory-fresh, fully guaranteed... all types, sizes. Over the highway; on-and-off-the-road; farm and tractor. Prices quoted at NO OBLIGATION. Offices and warehouses in New York City, Buffalo, Jacksonville, Omaha, Dallas, Los Angeles and San Francisco.

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☐ Send me a free copy of the Tire Load Computer and Gas Mileage Calculator.

Name _____ Title _____
Type of Business _____ No. Vehicles _____
Firm Name _____
Address _____
City _____ Zone _____ State _____

Sales and Service

Equipment purchasing and servicing takes less time when you know who and where to call. Keep advised of new distributors, sales personnel and other activities.

Distributors

Four Wheel Drive Auto Co.: Five new sales, parts, and service distributors of FWD four and six-wheel-drive heavy-duty trucks has been announced by G. F. DeCoursin, vice president for sales. They are the Choate Equipment Co. of Cedar Rapids, Iowa, for nine counties in Iowa and Rock Island county, Ill.; the Gulf Coast Truck and Equipment Co. of Houston, Texas, who will handle 16 Texas counties; Pashkow Motors of Monticello, N.Y., who will represent FWD in Sullivan county; and the Standard Equipment & Supply Co., of North Little Rock, Ark., who now have the entire state of Arkansas with the exception of six counties in the eastern part of the state.

General Road Machines, Inc.: Appointment of several new distributors has been announced by General Road Machines, Inc. of Niles, Ohio. Herman M. Brown Co., Des Moines, Iowa, will service the state of Iowa; W. H. Ziegler Co., Inc., Minneapolis, Minn., will handle Minnesota and North Dakota; Paving Supply & Equipment Co. of Washington, D. C., will act as General's distributor in Maryland, northeastern Virginia and the District of Columbia; Furnival Machinery Co. of Philadelphia, Pa., will cover Delaware, New Jersey and Pennsylvania; and the George P. Williams Co., Cleveland, O., will handle General sales in North eastern Ohio.

Baldwin - Lima - Hamilton Corp.: Four distributor appointments for Lima shovels, cranes, draglines and pull shovels have been announced recently. The Roy Long Equipment Co., Inc., of Columbia, S. C., will cover South Carolina; Emmet C. Watson Co., Inc., of Louisville, Ky., will cover Kentucky with the exception of Boone, Kenton, Camp-

Champions in their field ...



MARION 93-M • 2½ Yard Shovel • 80 Ton Crane

From the starting gun to the finish line—
from the windup until the javelin falls—
champions are a symphony of strength,
balance and endurance. The same qualities
make the Marion 93-M a stand out among
2½ yard machines—a true champion in its
field. Let the 93-M give you range, power,
strength, speed and dependable long life
of true championship calibre.

Marion Means Business

MARION POWER SHOVEL COMPANY, MARION, OHIO



Cord plies spirally applied in opposite directions, for highest flexibility

BUILT LIKE A TIRE...

it's the U.S. Royal Cord Air Hose!

Built like a tire—and *tough as a tire*, with a special construction found in no other air hose:

- *Exclusive.* Two counter-spiralled plies of tough special cord floated on resilient rubber for outstanding strength, shear resistance and flexibility.
- Braided cotton breaker ply anchors the tube to carcass permanently.
- Tube is high-quality neoprene for maximum hot oil resistance.
- Tough, brown natural rubber cover gives excellent

resistance to cuts and abrasion—protects unique construction under extreme service conditions.

U. S. Royal Cord Air Hose has a very high hydrostatic value, with a minimum of contraction or elongation. It is so tough and flexible that it needs no cribbing, can be run over repeatedly by heavy machines without harm. The "hose that's built like a tire" is obtainable in continuous lengths from any of our 28 District Sales Offices, or write Mechanical Goods Division, United States Rubber Company, Rockefeller Center, New York 20, N. Y.



Mechanical Goods Division

United States Rubber

SALES AND SERVICE...

Continued

bell, McCreary, Whitley and Bell counties; Evans Engine & Equipment Co., Seattle, Wash., will cover the western half of Washington and all of Alaska; and the Reno Equipment Sales Co. of Reno, Nev., will cover Nevada with the exception of Lincoln and Clark counties. Their territory also included Mono county in California.

Prime-Mover Co.: powered carts for placing concrete and hauling other building materials will be sold by the Contractors Supply Corp., Long Island City, in an exclusive territory including New York City and the southeastern part of the state. Another new Prime-Mover distributor is the Arrow Contractors Equipment Co. of Chicago, who will represent Prime-Mover in northeastern Illinois, including Chicago.

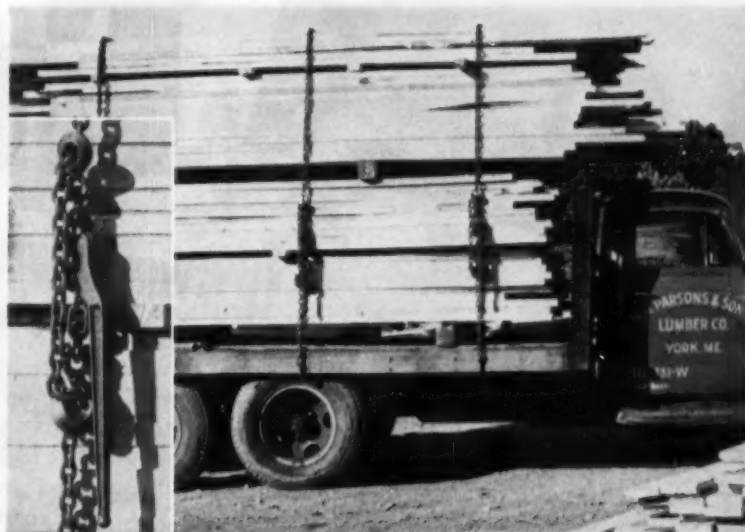
On the Sales Front

Heltzel Steel Form and Iron Co.: Kenneth Simpson, formerly with the Noble Co. and the Standard Steel Co., both of California, has been named district representative for Heltzel and the Flexible Road Joint Machine Co. He will cover 11 western states from his office at Redondo Beach, Cal.

Quick-Way Truck Shovel Co.: Theodore S. Petersen has been appointed assistant sales manager, it was announced by Mr. Daniel S. Heffron, director of sales. He was Quick-Way's district sales representative in California, Nevada, and Arizona. Douglas Corner, Jr., becomes district sales representative for the territory.

Atlas Powder Co.: James L. Wetzel, manager of the explosives sales office at Pittsburgh, Pa., has been named manager of the eastern district explosives sales office, with headquarters at Wilmington, Del. John K. O'Hare is the new manager in the Pittsburgh office.

Four Wheel Drive Auto Co.: Three new district sales managers have been appointed by FWD, manufacturers of heavy-duty trucks. Robert M. Ashley, with headquarters at Denver, Colo., will supervise dealer sales in Montana, Utah, Colorado, New Mexico, and Wyoming; Glen Pate, whose headquarters are at Dallas, Tex., is manager of an area including North Texas, Ok-



LOADS SAFELY BOUND

Safety conscious contractors tie down their truck loads of construction material with Laughlin Load Binders! There's no chance for injury or loss because the smooth lever action takes up $4\frac{1}{2}$ -inches of chain—holds lumber, piles, pipe, sheet material positively—safely! This tough, drop forged and

heat treated binder is the most versatile available—and it's made for the strongest chain! One Laughlin binder will handle four chain sizes! Merely switch Clevis Grab Hooks to fit the chain you're using! Keep Laughlin Clevis Grab Hooks on hand to fit your chains—then there'll be no delays!

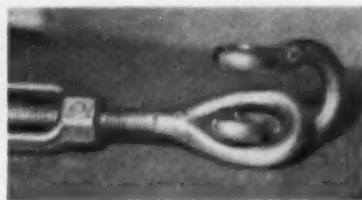
100% HOLDING POWER



When genuine Crosby* Clips secure wire rope rigging and tackle, men and materials are 100% safe! Positive gripping power gives confidence to workers, and confidence means top working efficiency. High strength steel is formed into the world-famous "Red U-Bolt"®. High wings on the drop forged base hold the rope securely in place. Look for the "Red U-Bolt"! You'll see it used

®REGISTERED TRADEMARK

on ropes of all sizes, because only Crosby offers a complete range of sizes to fit $\frac{1}{8}$ " to 3" diameter ropes!



AN EYE FOR SAFETY!

... that's the eye design that was originated by Laughlin engineers. The ear of a shackle only one size smaller slips through the pear shaped eye—a design that conforms more closely to the line of pull—makes Laughlin Turnbuckles stronger and safer! Hex ends on the hefty body make take-up fast and easy. Weldless, hot galvanized turnbuckles, forged from special steel, are available from Crosby-Laughlin Distributors in a variety of end fittings and in sizes from $\frac{1}{4}$ " x 4" to $2\frac{3}{4}$ " x 24"!

Stocked and sold by leading distributors everywhere

CROSBY-LAUGHLIN DIVISION

American Hoist and Derrick Company
FORT WAYNE, INDIANA

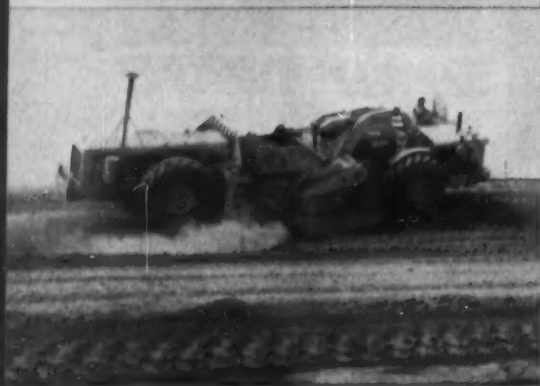
TS-18

"Eucs"

TWIN-POWER SCRAPERS get
more work done... *faster*



Twin-Power—two engines driving separate axles—was pioneered by Euclid 10 years ago. Torque converters and semi-automatic transmissions assure easy operation and a smooth flow of power matched to any job condition. The TS-18 is powered by two 218 h.p. engines with a 300 h.p. engine for the tractor available for work where maximum power can be used. Standard tires are 27.00 x 33 with 33.5 x 33 as optional. Harris Construction Company's "Twins" are TS-18 Specials with 518 h.p. and the larger tires.



With a total of 518 h.p.—300 h.p. in the tractor and 218 h.p. in the scraper—Harris' TS-18 Specials really made the dirt fly and completed the Glasgow Air Force Base grading weeks ahead of schedule.

Harris Construction Co. of Aberdeen, S. D. recently set a new record for earthmoving on Montana highway work with a fleet of six TS-18 Euclid Scrapers. In a six-day work week these "Eucs" moved 90,000 cu. yds. on a half million yd. road contract near Nashua on Route 2. They worked 10 hours a day—self loaded gravel, clay and shale without pusher tractors—on hauls averaging 1500 ft. Most of the time each machine worked alone making shallow cuts and fills on sections of the 13-mile job.

At nearby Glasgow Air Force Base, Harris used his original fleet of four TS-18 "Eucs" to move most of the 1,200,000 yds. of gumbo. Working two 10-hour shifts 6 days a week, each scraper averaged 69,000 yds. a month. Performance of the "Twins" on this air base job was so outstanding that 2 more were added to the Euclid fleet—and Harris has disposed of 8 other scrapers and 5 crawler tractors.

With two jobs only 26 miles apart the mobility and independence of the TS-18 Scrapers proved a big advantage. They moved from air base to road job and back again—as conditions required—in about an hour. There was no problem or expense in moving pusher tractors because none were needed at either job. And when a few loads of sand or gravel were needed for culverts or other use, a "Twin" or two took off for the nearest pit and did the job in a hurry.

Owner Ken Harris has found the Twin-Power Scraper the most efficient dirt mover he's ever used. His fleet with job availability of 95% has more than lived up to his expectations in production and low cost yardage. That's why he tells visitors to his jobs, "When I buy additional haulage equipment it'll be TS-18 'Eucs'".

For information on the complete line of Euclid earthmoving equipment, call your Euclid dealer—he can show you why *Euclids are your best investment.*



EUCLID DIVISION, GENERAL MOTORS CORPORATION, Cleveland 17, Ohio

set new earthmoving records

... complete tough jobs way ahead of schedule

On one section of this Montana highway job a T5-18 working alone averaged 450 yds. per hour. Haul was 200 ft.—heaped loads of 17 bank yards were picked up in less than a minute.



The 33.5 x 33 tires and NoSpin differentials of the T5-18 Specials provided the tremendous traction needed for self-loading the heavy gumbo and gravel and made efficient use of the 518 total h.p. on both of the Montana jobs.

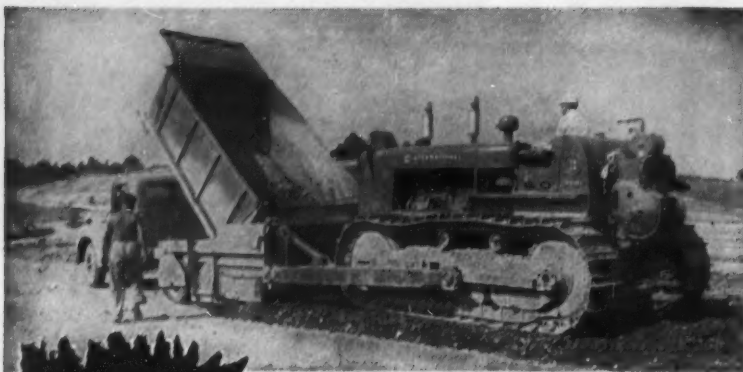
Ken Harris, head of Harris Construction Co. in South Dakota, says "the complete independence of the 'Twin' is revolutionizing road building on many jobs where concentration of equipment in any single cut is not practical." He's standardized on the T5-18 Special for his earthmoving equipment.



Euclid Equipment

FOR MOVING EARTH, ROCK, COAL AND ORE





**Owners report
up to 1000 tons
per hour with a
Jersey
Spreader!**

In conjunction with the propelling tractor, a Jersey Spreader is the **FASTEST, ACCURATE PAVING** Spreader in the World! . . . It is capable of spreading up to 5,000 tons of aggregate daily—easily and economically . . . It has been successfully used on such projects as: the New Jersey Turnpike, the Ohio Turnpike, the West Virginia Turnpike, the New York Thruway, the Garden State Parkway, Chrysler Tank Testing Bowl, many of the most important new airports and on large defense bases in Iceland, Newfoundland, Arabia and Africa.

Write now for complete information and illustrated literature.
MANUFACTURERS OF THE JERSEY SPREADER



TRACTOR SPREADER COMPANY

HASBROUCK HEIGHTS, NEW JERSEY

REG. TRADE MARK

**PORTABLE
ELECTRIC
POWER**

Right on any job!



PORTABLE POWER PLANTS

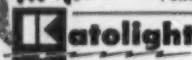
Right — you save time . . .

Right — you speed work . . .

because with Katolight Portable Power Plants, your crews have "plug-in" electricity instantly available to operate all types of tools, equipment and lights right on the job, whether it's highway, or light or heavy construction. Sizes and models, right for every portable, standby or continuous use, from 350 watts to 50 KW, AC, up to 500 KVA on request.

It's New!

WRITE FOR FREE FOLDER
ON NEW LIGHTWEIGHT
PORTABLE MODELS



CORPORATION

Box 891-106, Mankato, Minnesota

**MAYO
PNEUMATIC
GROUTER
and
"PEA
SHOOTER"**

**Simple
to
Operate
Highly
Efficient**



The Mayo Grouter quickly and easily places low-pressure grout in tunnels, mines, shafts, foundations, and sub-grades. It also may be used to inject sodium silicate emulsions for stabilizing caving or running ground.

This versatile piece of equipment can readily be converted to a "Pea Shooter" for shooting Pea or "Bird's Eye" gravel back of liner plates and back-packing outside lagging plates.

Write for Free Catalog 13 for full details and specifications.



MAYO

**TUNNEL AND MINE
EQUIPMENT
LANCASTER, PA.**

SALES AND SERVICE...

Continued

Iahoma, Kansas, and Western Missouri; and Robert J. Peterson handles FWD sales in Washington, Oregon, Idaho, Alaska, and British Columbia.

In the Main Office

International Harvester Co.: Howard S. Manwaring, assistant director of engineering since 1953, has been named director of engineering. In addition to administrative duties, Manwaring will place special emphasis on motor truck and construction equipment engineering activities. Manwaring joined International Harvester in 1934 as an experimental engineer in the motor truck plant.

Thermoid Co.: The appointment of John A. Muller as director of research and development was announced recently by Warren E. Hill, president. Before joining Thermoid in 1943, Muller was manager of mechanical new products development for the U. S. Rubber Co. Hill also announced the appointment of Charles M. Scholz as general manager of the rubber division. Scholz is a vice president of the company and is continuing as director of marketing for all divisions and subsidiaries.

Special Mention

Symons Clamp & Mfg. Co.: A new concrete forming equipment plant is now in operation at San Leandro, Cal. The new plant has 12,000 sq ft of factory space with an additional half acre for a rail spur and storage facilities for the firm's line of shores and column clamps. Joseph Von Drasek is vice president in charge of the new factory.

Koehring Co.: Crutcher-Rolls-Cummins, Inc., and Koehring will merge their activities dealing with the manufacture and sale of equipment used by pipeline contractors. Under the agreement, Koehring acquires the design and manufacturing rights to the C-R-C Big Incher and Middle Incher ditching machines, which will be built at Newton, Iowa, by the Parsons Co., a Koehring subsidiary, C-R-C will sell the ditchers, Koehring excavators, and Parsons Trenchliners to cross country pipeliners. Koehring recently announced the purchase of the Hydraulic Press Mfg. Co.

Murray Construction Co., Waverly, Ohio, specified torque converter drive for this new Allis-Chalmers HD-16. A-C Torque Converter Drive, which is optional on the HD-16 and standard on the HD-21, incorporates Twin Disc Torque Converter components as standard equipment.

Torque Converter Tractors do more work, faster... Last Longer!

Two people who should know—both owner and operator of an Allis-Chalmers HD-16C torque converter tractor—unanimously agree that a torque converter crawler works faster, works longer, lasts longer and produces more.

As Robert Murray, co-owner of Murray Construction Co., Waverly, Ohio, puts it, "Our new HD-16 tractor is a speedy worker and the torque converter is one of the primary reasons. We also find we haul more yardage for each dollar spent."

Operator Kenneth Austin adds, "Our former tractor would stall loading rock like we encounter on this job, but the '16' goes right through. The torque converter saves clutching and makes it a lot easier for me. At the end of a day's work I'm not nearly as tired."

Murray's HD-16 is used for dozing and for pulling a scraper in rock-like shale—in the relocation of route 73, northwest of Peebles, Ohio. On one stretch of road, fill being hauled 1200 ft. by the 150 hp crawler and a 15-yd. scraper, will raise the highway grade where it crosses a valley.

Torque converter drive offers you higher work output in less time, and longer equipment life because it automatically matches power to load demand, thus minimizing or eliminating gear shifting... it eliminates harmful engine lugging and stalling... it cushions out—through fluid connection—overloads, shock loads and vibrations—providing longer tractor life with less maintenance.

For these reasons, Allis-Chalmers designed torque converter drive into their HD-16 and HD-21* Crawler

Tractors. Since 1940, they have worked closely with Twin Disc Engineers, and have standardized on Twin Disc Torque Converter components.

Specify a torque converter for your next Allis-Chalmers HD-16! See your tractor dealer today, for complete information on A-C Torque Converter Drive.

*Torque Converter Drive is standard equipment on the HD-21.



TWIN DISC CLUTCH COMPANY, Racine, Wisconsin (Hydraulic Division) Rockford, Illinois

Insurance costs go down



as skyscraper goes up

The story of Liberty Mutual and the Socony-Mobil building

Building a 45-story skyscraper in Mid-Manhattan was a tough, dangerous assignment — yet the safety record on the Socony-Mobil Building was far better than all calculations. Here's why:

General Contractor Turner Construction Company and all sub-contractors were insured by one company — Liberty Mutual. This made it possible for Liberty and Turner to draw up an over-all safety plan — chart the hazards and devise ways to sidestep them — before the job began.

Liberty Mutual provided full-time, on-

the-job claims and engineering supervision. Regular safety meetings were held. Every activity was checked. All injuries received immediate attention. Structural surveys and pre-blasting checks were provided by Liberty Engineers. Wherever a man turned, there was a common-sense slogan reminding him to work safely.

Thanks to complete cooperation from management and workers — Liberty's integrated safety program paid off in a noteworthy loss record — insurance savings all along the line.

10 WAYS LIBERTY MUTUAL CUTS INSURANCE COSTS ON CONSTRUCTION JOBS



1. ADVANCE ANALYSIS, by Liberty engineers, spots and controls potential hazards before each of your projects begins.



2. ENGINEERS ON THE JOB who keep your men safe, control damages due to blasting, unsafe operating methods, etc.



3. RESEARCH by specialists in Liberty's own laboratory helps solve your difficult problems.



4. AROUND-THE-CLOCK CLAIMS SERVICE — full-time claimsmen on the bigger jobs — assures fast, fair claims handling.



5. ABILITY TO FOLLOW YOUR OPERATIONS — Liberty has branch offices in 146 cities — at your service.



6. SERVICE PERSONNEL live on large projects both here and abroad, plan and guide safety operation.



7. LARGE MEDICAL STAFF, plus three rehabilitation centers, assures the best treatment for injured men.



8. SPEEDY AUDITING service, tailored to your needs, assures proper allocation of payroll classification.



9. YOU DEAL DIRECT with company sales, loss prevention, claims and medical personnel. No middlemen.

10. INSURANCE AT LOW COST. Liberty's "expense ratio" on Compensation is lower than any other mutual company. Liberty has returned \$363,275,898 in dividend savings to policyholders.

For 20 straight years — the nation's largest writer of
Workmen's Compensation Insurance

LIBERTY MUTUAL

The Company that stands by you

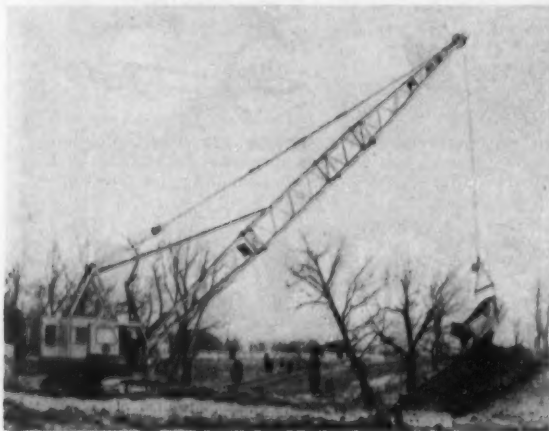
Liberty Mutual Insurance Company • Liberty Mutual Fire Insurance Company • Home Office: Boston

Construction Equipment News ...



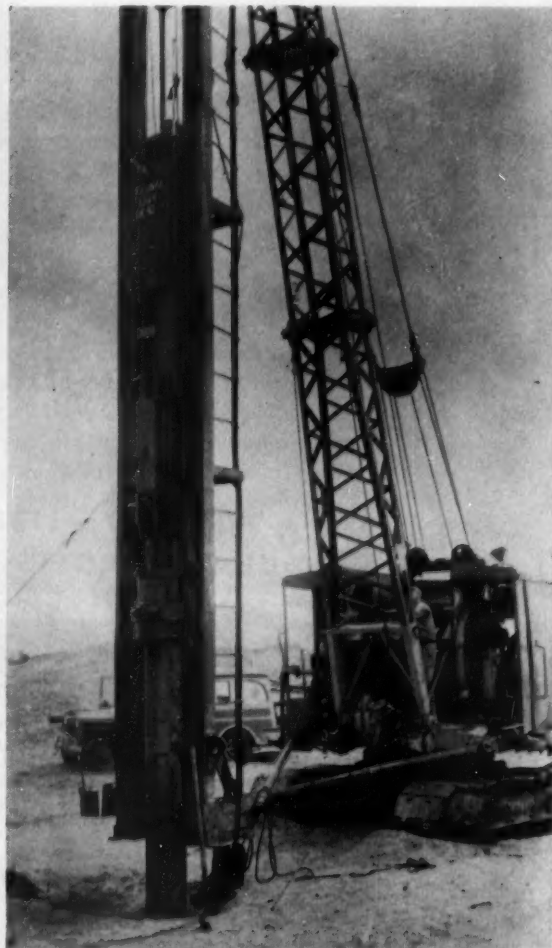
Lightweight German Excavator

The $\frac{1}{2}$ -yd Demag B 504 excavator, a fully hydraulic unit manufactured in West Germany, weighs only 11 tons. The crawler-mounted excavator is powered by a 3-cylinder, air cooled Deitz diesel engine that delivers 42 hp at 1500 rpm. Its hydraulic system is controlled by two Pittler high-pressure pumps that are connected directly to a hydraulic motor. Digging power and bucket speed adapt automatically to ground resistance so that there is constant and positive digging force throughout the entire work range without the need for clutches or brakes—Demag Baggerfabrik GMBH, Dusseldorf, Benrath, Germany.



Koehring's Biggest Excavator

Latest and largest of Koehring's line of shovels and cranes, the model 1205 excavator is listed in the 3-yd dipper capacity class. Lift capacity is rated at 95 tons. It is converted easily from shovel to lift crane, dragline, or clamshell. As a 3-yd shovel, it combines a 30-ft boom with 22-ft dipper sticks. As a crane, it has a standard 60-ft main boom that can be extended to 180 ft, plus a 30-ft jib. The unit features an all-welded turntable, power actuated main drum clutches, and mechanical swing and main clutches.—Koehring Co., Milwaukee 16, Wis.



Internal Combustion Pile Hammer

McKiernan-Terry has introduced its first internal combustion pile hammer—a self-contained, diesel-powered unit with built-in fuel and lubricant reservoirs. Called the DE 30, the hammer has a 3,000-lb ram that delivers 45 to 55 strokes per min with an average force of 18,000 ft-lb per blow. It is worked by a single load line from a 30 to 35-ton crane. To start the hammer, the ram is lifted with the load line and allowed to fall. During the downward stroke the ram actuates a pump that delivers a measured amount of fuel to the anvil block. When the ram strikes the fuel it is atomized by the impact and ignited by compression. This explosive force drives the ram upward and the anvil downward. The hammer operates at a speed and stroke determined by pile resistance—the greater the resistance, the longer the stroke and the greater the energy delivered to the pile. To stop the hammer, the fuel pump cam is disengaged. Sufficient capacity for three days of operation is provided by a 25-gal fuel tank and a 5-gal lubricant tank. The DE 30 is a forerunner of a 2000-lb ram hammer and a larger unit with a 4,000-lb ram.—McKiernan-Terry Corp., Dover, N. J.



Self-Propelled Scraper Hauls 26 Yd

With a heaped capacity of 26 yd, the new Woolldridge Cobra Quad is the biggest 3-axle self-propelled scraper on the market. Rated at 20-yd struck and 56,000-lb carrying capacity, the scraper is powered by a 300-hp Cummins NRT-6 diesel. A helical gear synchromesh Fuller transmission provides nine speeds forward up to 32 mph and two speeds in reverse. The unit makes a 360-deg non-stop

turn in 38 ft when steering brakes are used. Tires are 29:5x29, 28-ply on scraper and rear tractor wheels and 14:00x24, 16-ply on front tractor wheels. Ground clearances are 16 in. under tractor and 21 in. under the scraper. Clutch, transmission, and cable winch are air-actuated. — **Woolldridge Mfg. Div., Continental Copper & Steel Industries, Inc., Sunnyvale, Calif.**



Bituminous Curb Paver

Etnyre's self-propelled automatic curb paver lays 90% compacted bituminous curbing at a 4 to 6-fpm rate without forming. Before the curbing is laid, the surface is preheated and blast-cleaned with exhaust gases from the machine's engine. Exhaust gases also heat the mold, making it easier to get a good finish. Molds are easily interchangeable. — **E. D. Etnyre & Co., Oregon, Ill.**



Pneumatic Roller Takes 3½-to-1 Slopes

Because it has a low center of gravity and six driving tires, the Grace pneumatic roller is stable enough to roll 3½-to-1 slopes. The roller, which has a maximum gross load capacity of 11 tons, is powered by a 48-hp, 6-cylinder engine. Four gears forward and reverse provide equal speeds in either directions up to 14 mph. The roller has 11 wheels with 7.50x15 smooth tires. All wheels except one oscillate, and there are brakes on

all wheels except one. Any tire can be removed without disturbing the other tires by jacking up the roller only 2 or 3 in. The operator's seat is mounted to the side and in the middle of the rig to assure good visibility. The roller has hydraulic power steering as standard equipment. Water tank and sprinkler pipe are available for rolling hot pavements. — **W. E. Grace Mfg. Co., 6100 S. Lamar St., Dallas, Texas.**



Rotates Full 360 Deg

The Yumbo truck-mounted hydraulic shovel—developed in Italy and now being produced here—features a double-race, 168-ball bearing turntable that rotates 360 deg right or left. It can be fitted as a ¼-yd backhoe that digs 10-ft deep, ½-yd clamshell, or 3½-ton crane. Heavy-duty hydraulic system includes three cylinders. — **Geco Mfg. Co., 5701 Colorado Blvd., Denver, Colo.**

Continued on page 167



Snug right-of-way just routine condition for compact maneuverable Cleveland®

Dodging utility poles, trees and other obstructions, the compact, husky Cleveland "110" cuts utility trenches efficiently in narrow clearances like this. Its full-crawler mounting and low ground bearing pressure are real public relations assets because they minimize damage to lawns, sidewalks and driveways . . . permit efficient digging in soft muddy ground and rugged ter-

rain too. Fast, safe trailer portability, coupled with full-crawler on-the-job maneuverability and a wider range of usable digging speed combinations make Clevelands fast *to* the job and fast *on* the job. You dig more trench . . . in more places . . . at less cost . . . with dependable Clevelands, first choice for utilities trenching for more than 30 years. Talk it over with your local distributor.

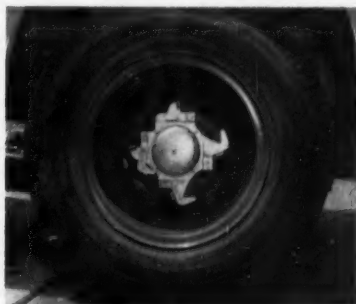


THE CLEVELAND TRENCHER COMPANY

20100 ST. CLAIR AVENUE • CLEVELAND 17, OHIO



ALL - WHEEL DRIVE—Designed to carry mixers of 5½-yd capacity, the Oshkosh model 18-34 6x6 carrier provides weight distribution of 18,000 lb on the front axle and 34,000 lb on the rear axle. Power steering and short wheel base assures good maneuverability. Power on all three driving axles provides six-wheel drive traction. Other features include an engine cantilevered forward on the front axle to permit easier servicing of the engine and the Vickers power steer; front shock absorbers; 10 forward speeds; and a Bostrom driver's seat.—Oshkosh Motor Truck, Inc., Oshkosh, Wis.



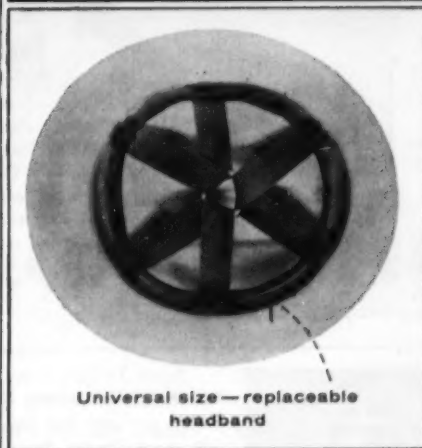
BACK-UP PROTECTION—The new Bullard Back-Up Alarm for trucks is a self contained unit easily attached directly to the rear wheels of any dual-wheeled vehicle with full floating axles. It operates automatically by gravity, and does not depend on electrical circuits or the speedometer. Mounted outside on left and right rear wheels, the alarm rings loud and clear only when the vehicle is in reverse. When the vehicle is moving forward the hammers fall against rubber stops that eliminate noise. The alarm is a 6-in. metal bell mounted on a steel plate. It is installed on the axle hub of the wheel, where it is protected from damage. Four hammers strike the bell once every quarter revolution when the wheel is in reverse motion. The alarm rests directly upon the heads of the bolts that hold the axle in place. Mounting is accomplished



PROVEN BY THE REBOUND!

These Bullard engineering and sales research men are studying not only the impact, but also the rebound of this eight pound ball. Rebound action is the extra safety margin in Bullard safety hats and caps. Their scientifically designed three-ribbed crown not only resists impact but deflects heavy falling objects. This is one of the reasons why Bullard fiber glass hats and caps surpass all necessary industrial tests.

Greater protection plus style, comfort and color make Bullard head protection the best and longest lasting buy in safety hats and caps. Chin straps, winterliners and face shields are available for all styles of Bullard safety hats and caps.



Universal size—replaceable headband

Choice of permanent molded-in colors to identify company or trade. Aluminum hats and caps available also in variety of colors.



Three-ribbed crown construction



BULLARD

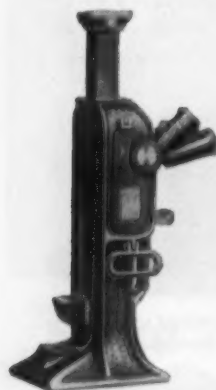
E. D. Bullard Company, 275 Eighth St., San Francisco



Doing It the Easy Way with SIMPLEX JACKS...



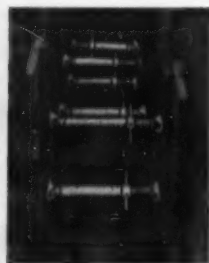
PRESTRESSING CONCRETE SLAB with a Simplex Re-Mo-Trol 30-ton hydraulic puller. When cured, 26' x 38' slab will be raised to form third story floor of school building. Intervening floors will then be cast, prestressed and raised into position. Only Re-Mo-Trol gives straight-line pull to prestressing wires through unique "center-hole", eliminates need for complicated back-up devices. Also has many uses as a powerful lifting jack on construction jobs.



15-TONS OF LIFT on either the cap or toe of this Simplex Model 24A jack is a feature that construction men like. Full capacity toe lets them lift from minimum clearances, cuts wedging and blocking necessary. Jack is ratchet lowering lever type; raises or lowers notch-by-notch—can't be tripped. 13" of lift.



TIMBER "STRETCHER" speeds shoring on foundation and tunneling work. Simplex Shoring Jacks, available in 25-ton or 35-ton sizes, are faster and safer than old-fashioned saw and wedge methods.



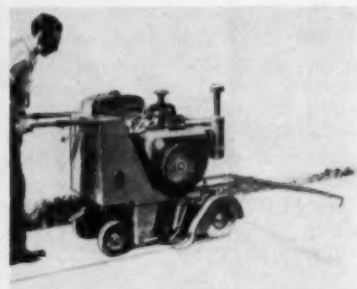
WHEN YOU'RE DOWN A HOLE you can feel safe with these Simplex Trench Braces on the job. Made entirely of drop forged steel. Easy to adjust, grip at any angle, can be nailed to timber for slip-proof safety. For any width trench.

SIMPLEX CONSTRUCTION JACKS are fully described in General Catalog 56. Write for a free copy.

TEMPLETON, KENLY & CO.
2509 Gardner Road • Broadview, Illinois

EQUIPMENT NEWS... continued

with two cap screws that pass through the rear plate of the alarm and fasten into the threaded holes normally present on full floating axle flanges. The device was developed by Max von Radics and William Bookwalter of Miller Construction Co. (See Job Talk, Jan. 1956, CM&E.)—**E. D. Bullard Co.**, 275 Eighth St., San Francisco, Calif.



CONCRETE SAW—Engineered Equipment's new model concrete saw will cut at any speed from 10 in. to 20 ft per min. By changing the guard, the saw can accommodate blades from 12 to 20 in. dia. The saw is available with 15, 25, or 36-hp Wisconsin air-cooled gasoline engines, either manual or self starting. The engine is mounted on the frame instead of arm. This feature provides weight over the blade, faster manual screw depth setting, and better alignment of the blade. The blade travels in a straight line because it is designed with a direct drive to the axle instead of to the wheels. The saw has an automatic throttle control that idles the motor when the blade is removed from the cut.—**Engineered Equipment, Inc.**, Waterloo, Iowa.

REDESIGNED CRUSHER—The new Cedarapids Junior Tandem crushing and screening plant has been redesigned to give it greater versatility and increased capacity. A larger screening area is one important new feature. A half deck has been added to the horizontal vibrating screen and it has been widened by 6 in. so that the standard 2½-deck screen size is now 42 in. by 10 ft. This provides flexibility for producing from one to three products simultaneously in sizes ranging from 2-in. road ballast down to minus ¼ in. Several crusher sizes are available, including a 10x36-in. jaw crusher and the standard 10x24-in. jaw crusher



S & M Construction Company, Providence, R. I., uses 12 of these Mack LJSWX diesel dumpers under 2-yard Lorain shovel in excavating peat bog near Atholl, Mass., on a by-pass for U. S. Route 20.

ONLY A SPECIALIST NEED APPLY...

... For only Macks can get in and out of mud like this under their own power!

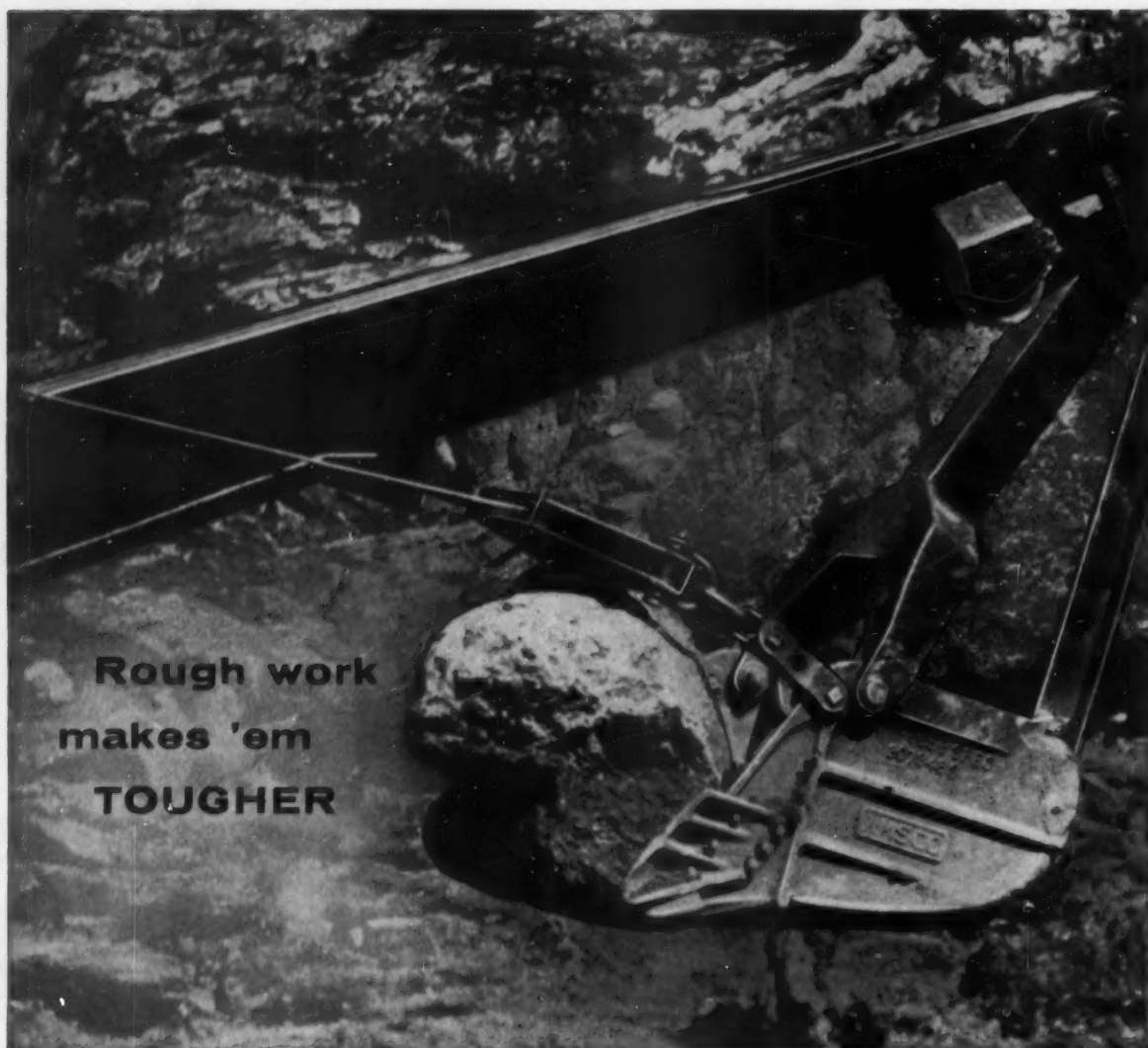
Axle deep in soft, soupy mire and hauling a full load of heavy peat bog, 80% water, this Mack dumper will pull out of the muck and be on its way . . . and back again on schedule.

It's Mack's famous Balanced Bogie, along with Mack's exclusive Power Divider, that makes seemingly impossible tasks like this everyday assignments for Macks. This wonder-working team delivers torque to each wheel in proportion to its

traction. In addition, it assures uniform tire loading and braking on all four rear wheels, and maximum stability under any terrain or road conditions.

When you add the Balanced Bogie and Power Divider to Mack's rugged construction, ease of maintenance, and economy of operation, you'll see why Macks are the most versatile trucks, the biggest money makers in the construction industries today. See your Mack Branch or Distributor for complete details. Mack Trucks, Inc., Plainfield, New Jersey.

MACK . . . first name for trucks



**Rough work
makes 'em
TOUGHER**

Amsco Backhoe Buckets **WORK-HARDEN** IN SERVICE

One-piece castings of extra-tough manganese steel give maximum impact and abrasion resistance

Impact work-hardens manganese steel to as high as 550 BHN. Further abrasion only polishes this tough steel. That's why Amsco® manganese steel outlasts other steels by as much as ten to one, under heavy impact and abrasion.

An Amsco Backhoe Bucket is a tough, *one-piece* manganese steel casting. This one-piece body eliminates the danger which fabricated-bucket users face of the hoe bucket

breaking up when digging in rock or rough operations. The teeth on Amsco hoe buckets are reversible and renewable, and side cutters can be bolted on to order.

On scores of tough digging jobs, you'll find these Amsco buckets cutting a full swath, unloading cleanly and providing maximum digging efficiency.

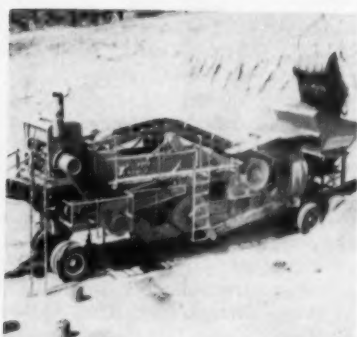
Available in both standard and special styles, in all regular sizes from $\frac{3}{4}$ -yard to $1\frac{1}{2}$ -yard capacity. For full information, call your nearby Amsco representative or your shovel manufacturer's dealer.



AMSCO

American Manganese Steel Division • Chicago Heights, Ill.

OTHER PLANTS IN: DENVER, LOS ANGELES, NEW CASTLE, DEL., OAKLAND, CAL., ST. LOUIS, JOLIETTE, QUEBEC



for primary reducing, and 24x16-in. or 30x18-in. roll crushers for secondary crushing. Crusher sizes can be matched or mixed in various combinations. Other new features include a mono-type elevating wheel with a drum 78 in. in dia and 22 in. wide; separate clutch control on the screen; new delivery conveyor backstop; new belt wipers and self-cleaning pulleys, and larger hopper.—Iowa Mfg. Co., Cedar Rapids, Iowa.



POWERFUL 14-YD SCRAPER—

A 200-hp, six-cylinder Allis-Chalmers diesel engine powers the new TS-260, a medium-sized self-propelled scraper rated at 14 yd heaped, 11 yd struck. Features of the new scraper include a hydraulic pump that is gear driven from the rear of the engine crankshaft to provide positive drive and live power for steering and scraper operation; a curved bottom and a 3-piece cutting edge with the center edge offset for faster penetration and better loading action; and a selective hydraulic steering unit that provides two-speed steering. The two-speed hydraulic steering system is controlled by a valve that is linked directly to the wheel. A 30-deg turn of the steering wheel directs power to double-acting steering jacks for fast 90 deg steering. When a slower turn is desired, a slight turn of the wheel permits a regulated pump flow that provides slower response. Weight has been distributed on the axles to provide maximum traction, flotation, and longer life for the standard 21.00x25 tires. When empty, 66% of the weight is carried on the tractor wheels and the

MARVEL SYNCLINAL FILTERS

For Efficient Filtration of—
Hydraulic Oils
Fire-Resistant Hydraulic Fluids
Coolants — Lubricants
Water



SUMP TYPE
(Cutaway)



LINE TYPE
(Cutaway)

PROTECT EQUIPMENT
INCREASE OPERATING TIME
REDUCE MAINTENANCE

Marvel Synclinal Filters installed in sump or on line preceding pump offer maximum protection on all hydraulically actuated and other low pressure circulating oil systems. Maintenance and operating costs are reduced because Marvel Synclinal Filter's BALANCED design offers greater ACTIVE filtering area with sufficient storage capacity for filtered-out damaging particles; thus, longer periods of operation are attained at minimum "down time" due to maintenance and repairs.

CONSTRUCTION ENGINEERS and MAINTENANCE MEN

whose job it is to keep machinery operating at peak efficiency are specifying Marvel Synclinal Filters on all new equipment and standardizing with Marvel Synclinal Filters on existing equipment.

OVER 650 ORIGINAL EQUIPMENT MANUFACTURERS NOW INSTALL MARVEL SYNCLINAL FILTERS AS STANDARD EQUIPMENT.

EASY TO CLEAN

Marvel Synclinal Filters can be easily disassembled, thoroughly cleaned and reassembled, on the spot, in a matter of minutes. Line type operates in any position and may be serviced without disturbing pipe connections.

MARVEL ENGINEERING COMPANY, 7227 N. Hamlin Ave., Chicago 45, Ill. Phone: Juniper 8-6023

Please send Marvel Synclinal Filter catalog(s) as indicated

☐ #107 for Hydraulic Oils, Coolants and Lubricants.

☐ #301 for Water

Data on Filters for Fire-resistant Fluids

☐ AQUEOUS BASE ☐ SYNTHETIC

Name _____ (CME-8)
Company _____
Address _____
City _____ State _____

A SIZE FOR EVERY NEED

Available for sump or line installation in capacities from 5 to 100 G.P.M. Greater capacities may be obtained by multiple installation (as was described in catalog). Choice of Marvel mesh sizes range from coarse 30 to fine 200.

IMMEDIATE DELIVERY!

As in the past, Marvel continues to offer IMMEDIATE DELIVERY.

**Less down time... longer life when
protective maintenance is done ON TIME!**



HOBBS Engine Hour Meters

Modern engineers consider maintenance of powered equipment in terms of HOURS instead of miles. ON-TIME lubrication, filter replacement, oil change, overhaul, etc., means better performance and longer equipment life.

The Hobbs Meter, a true electric timing instrument, records actual running time in HOURS and MINUTES—not a revolution counter! Two models—direct-reading (upper illustration) and pointer type. Approved and recommended by leading manufacturers of construction equipment. Ruggedly built... easy to install in the field. See your factory branch, representative or distributor... or WRITE:

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EXTRA STRENGTH and DURABILITY ...for Your Rock Drills and Other Heavy Duty Air Tools

"SUBWAY"

"Standard of Quality"

"Subway" is built with that extra measure of strength and durability that assures uninterrupted delivery of maximum air power to the drills, even when the "going" is roughest. Light weight, flexible, easy to handle. Specifications include oilproof tube; highest quality wrapped duck carcass; wear and weather-resistant red rubber cover, with new criss-cross yellow stripe for positive identification. Sizes $\frac{1}{2}$ " to $1\frac{1}{4}$ ", I.D., in maximum lengths of 50 feet.

EXTRA SAFETY ...For Your Caissons and Manifolds

"Standard of Quality"

"ALLGOOD CORD"

"Allgood Cord" . . . long famous for its outstanding strength and safety for three most important air hose applications—supplying air to caissons where human lives are at stake; feeding air to Jumbos where a shut-down would effect not one but a battery of drills; and as a main air line to shovels in tunnel headings. Specifications include black synthetic tube; special kink-resistant wrapped duck carcass; wear-resistant white rubber cover.

"Allgood Cord" is made in sizes $1\frac{1}{2}$ " to 4", inclusive, in maximum lengths of 50 feet.

"If it's GOODALL, it MUST be Good!"

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Standard of Quality—Since 1870

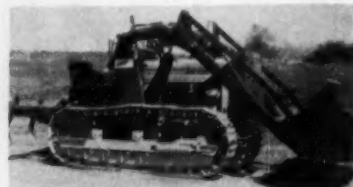


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AND OTHER INDUSTRIAL RUBBER PRODUCTS

GOODALL Rubber Company

GENERAL OFFICES, MILLS and EXPORT DIVISION, TRENTON, N. J.
Branches and Distributors Throughout the United States and in Canada

remaining 34% on the scraper wheels. When loaded, each tire supports an equal amount. The scraper has an all-steel welded box-type frame that makes the unit easy to service. The engine can be removed without removing the transmission, and the clutch can be removed without removing the engine. Foam rubber seats, shatterproof windshields, conveniently-positioned controls and good visibility are other features—Allis-Chalmers Mfg. Co., Milwaukee, Wis.



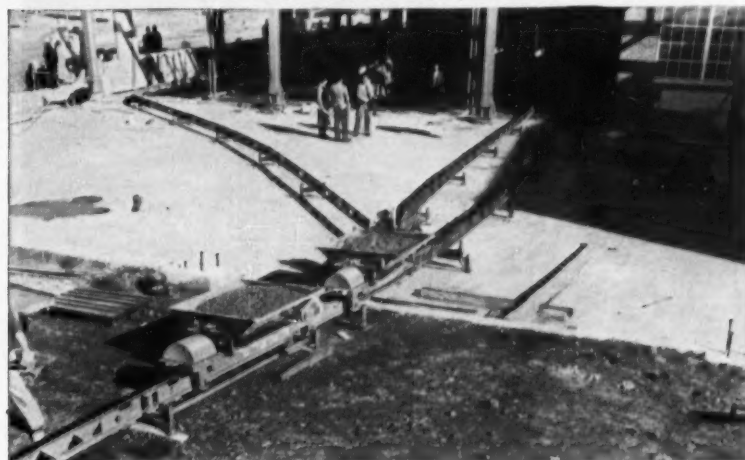
DEERE TRACTOR SHOVEL—The Henry TS-40F industrial tractor shovel has been tested and approved by John Deere for use on its 420 and 40 crawlers. Features of the Henry shovel include a self-leveling bucket, double-acting $3\frac{1}{2}$ -in. lift cylinders, solid steel lift arms, and a full flow oil filter. Lifting capacity to full height is 3,000 lb and breakaway is 5,000 lb.—Henry Mfg. Co., 1700 North Clay, Topeka, Kan.



SELF-CONTAINED DRILL—Atlas Copco's new self-powered Cobra drill and breaker, which weighs only 53 lb complete, can be a handy tool in remote areas where compressors are not available. Powered by a one-cylinder, two-



10 cu. load of concrete for the Railporter trailer.



360-foot unattended round trip every 2 1/4 minutes.



Rail stands straddle reinforcing mesh and conduit.

"The new



saved us \$1.15
a yard..."

This was the performance of the Rex Railporter on an office floor slab pouring job for Klug and Smith, Inc., of Milwaukee, Wisconsin. The Rex Railporter, complete with trailer unit and unattended, covered an average round-trip distance of 360 feet every 2 1/4 minutes with a 20-cubic-foot load of concrete...better than 18 yards an hour with only six men to charge, convey, place and puddle.

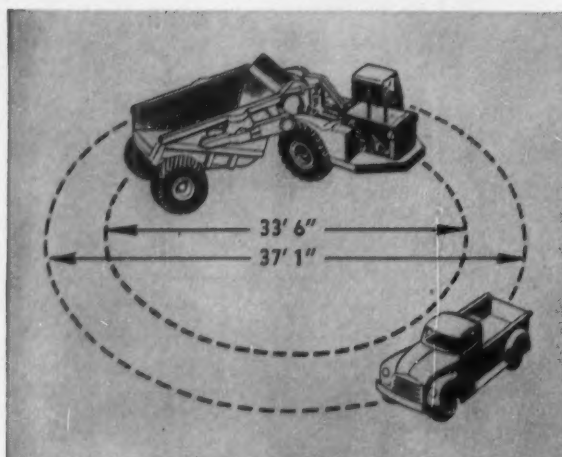
The Rex Railporter, a portable transport for construction material, runs on a single rail which is easily handled and laid by two men. Rail stands are adjustable for rough terrain. On this job the rail straddled the reinforcing mesh and conduit, eliminating the need for runways.

The Railporter is self-powered, runs unattended between loading and discharge points, stops automatically where desired and can be dumped to either side. Power and trailer units each carry 13 cubic feet of material (liquid level) or 10 cubic feet of concrete. See your Rex Distributor or write for Bulletin 56-47. CHAIN Belt Company, 4664 W. Greenfield Ave., Milwaukee 1, Wis.



CHAIN BELT COMPANY

PRINTED IN U.S.A.



Athey PR21 TURNS SHORTER ← than 1/2-ton pickup truck

Morrison-Knudsen, Inc. had some narrow ledge work on a railroad relocation job near The Dalles, Oregon. The work required a really sharp-turning, easily handled unit. "Short-turning Athey Rear Dumps solved our problems in cramped quarters," said E. B. Potter, Project Manager.



Tight turning means top production . .

Take a ledge only 34 feet wide in places. Put a 2 1/2 yard shovel on it. The space "left over" is for the hauling unit. That's the problem Morrison-Knudsen faced. The Athey PR21 Rear Dump Trailer supplied the answer.

Large trucks couldn't do the job because they couldn't turn around without complicated back-and-forth maneuvering. The PR21, however, drove in, swung around once, backed under the shovel. No lost time! In fact, the PR21 can turn in less space than a small pickup truck as the sketch at the top shows.

But a short turning radius is not the only outstanding feature of the PR21. It's built to handle big, tough rock or any abrasive material. Hydraulically controlled throughout, one lever dumps the load. The large body is clean and uncluttered — material discharges quickly and cleanly. With the

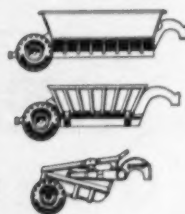
load cradled down between the wheels and the tractor driver wheels well away from the edge of fill or dump, safety is assured. Most important, the PR21 is designed for profitable performance in tough work day after day with a minimum of down time and a maximum of profit time.

Check into the Athey PR21 today! Get all the facts on the trailer that's proved itself a top producer all over the world. See your Athey Dealer for all the facts.

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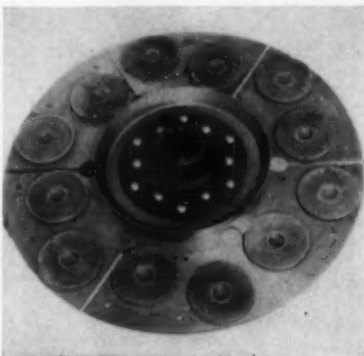
world's finest rubber-tired trailers!



stroke gasoline engine, the Cobra will drill about 75 ft of hole per gal of fuel. It can drill through granite at a rate of 26 ft per min. The drill, equipped with a pull-type starter, features a new floatless carburetor that permits drilling in positions ranging from straight down to 45 deg upward. Flushing is provided by air from a special compressor unit mounted on top of the drive piston. The drill is packed in plywood cases measuring $26\frac{1}{4} \times 19\frac{3}{4} \times 13\frac{1}{2}$ -in. It can be converted from a drill to a breaker within seconds by changing three small parts.—Atlas Copco Eastern, Inc., Paterson, N.J.



DIGS DEEP—To meet contractors' demands for a backhoe that would dig deeper than 12 ft, the Shawnee Mfg. Co. has marketed the model D90 backhoe. It digs effectively at the 14-ft level, and has an actual reach below ground level of 15 ft. In addition to offering exceptional digging depth, the backhoe has a push cylinder at the bucket boom synchronized with the action of a pull cylinder located midway between the axis and the bucket. Called push-pull power by the manufacturer, the two synchronized cylinders relieve strain on the axis and increase digging pressure. The new backhoe operates in any of three 120-deg quadrants and the operator can switch the boom to any quadrant without moving from his seat. Hydraulically controlled stabilizers align the tractor for plumb digging when it is working sideways on a hill or with one wheel on a curb. The backhoe can be removed from the tractor by loosening four pins.—Shawnee Mfg. Co., Inc., Topeka, Kan.



TOUGH CLUTCH FACING—Lipe-Rollway clutch plates are available with ceramic-type linings that resist heat and friction much better than conventional organic facings. According to the manufacturer, the new facings have characteristics that give them up to five times the life of ordinary facings. The new ceramic friction material is compressed within shallow metal cups or buttons, with six such buttons comprising the facing on each side of the plate for clutches up to 14-in., and 12 buttons on each side for clutches bigger than 14 in. The buttons are mounted back to back on either side of the plate, with a single tubular rivet holding each pair in place. The new facing, a blend of heat-stable ceramic and metallic ingredients, is so tough that ceramic linings provide a load capacity up to 50% greater than that of conventional facings.—Lipe-Rollway Corp., 806 Emerson Ave., Syracuse, N.Y.



TRACTOR-MOUNTED MIXER—The Frohring G-3 Redi-Mixer rides suspended above ground at the rear of any tractor with a standard 3-point hitch. It is rotated with a power take off from the tractor and can be raised and lowered for loading and dumping by the tractor's hydraulic equipment. A choice of either hydraulic or manual bowl-tilt models is available, with capacities ranging from

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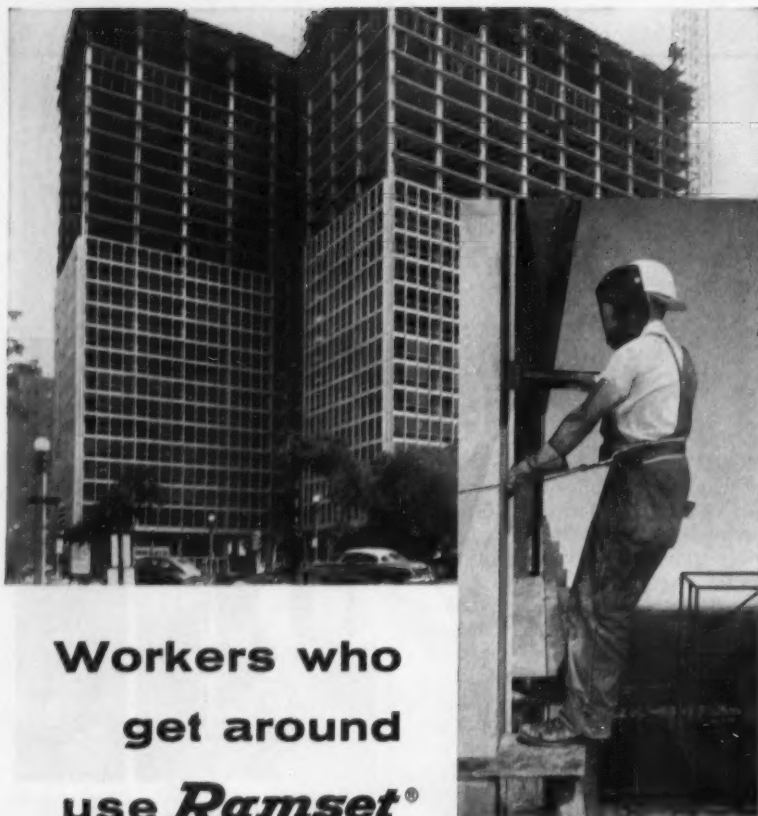
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companion to **Ramset**



This hammer-in tool for cinder block and masonry uses no cartridge; just makes hammer-power more effective. When nails fail and RAMSET is more powerful than needed, use SHURE-SET!

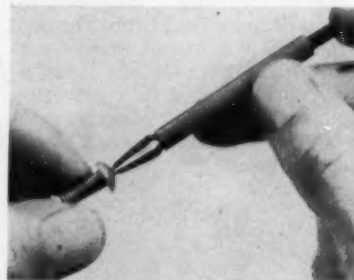
Ramset Fastening System

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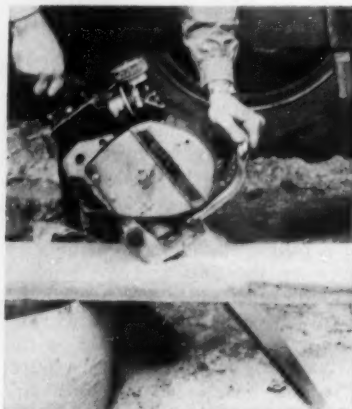
12103-H BERE A ROAD • CLEVELAND 11, OHIO

EQUIPMENT NEWS... continued

3 to 5 cu ft. The mix may be prepared in transit and then dumped directly into forms anywhere a tractor can be driven. Because the bowl rotates during the dump, a complete, clean discharge is assured. It can be mounted and dismounted from most tractors in less than 5 min.—**R. L. Frohring Machine Co., Newbury, Ohio.**



HOLDS SCREWS—The H.J.J. screw-holding driver is the answer to the nerve-racking job of placing and starting screws in hard-to-get-at places. Two bits that expand to grip the screw as the bit is placed in the screw slot hold the screw securely. When the screw has been started, the bits are removed by tapping a release rod. The screw-holding driver is manufactured in a variety of lengths, including 10, 8 and 6-in. sizes, to handle from #0 to # $\frac{1}{4}$ slotted screws.—**H.J.J. Co., 268 Marlow Drive, Oakland 5, Calif.**



VERSATILE SAW—The reciprocating blade of the gasoline-powered Wright power saw slices through wood at a speed of 173 strokes per sec. It will cut from any position, including upside down. The blade is protected with a guard that protects the operator and also guides the saw. Another safety feature is a cut-off switch



Ditching the Staunton River for pipeline near Long Island, Va. They're shooting it thoroughly. Here you see 6000 lbs. of Atlas HV Gelatin hard at work shattering, lifting, and throwing aside tough rock from river bottom.

Shoot it hard

for
maximum
economy



Excellent job! Thorough shooting gets job done right the first time. Only a minimum of secondary shooting. Pipeline pushes through right on schedule. Contractor gets real economy.

ATLAS EXPLOSIVES and ATLAS METHODS— the right cost-cutting combination

No time to let "obstacles" get in the way when you're pushing through a pipeline. Time and money won't allow you to "shoot it over"—especially on a river crossing. So when surrounding conditions permit, it pays to shoot it *thoroughly*.

This was the thinking of Wiley N. Jackson Co., Roanoke, Va., subcontracting for Williams Bros., Tulsa, Okla., when they crossed the Staunton River. Shooting it hard—with 3 tons of Atlas HV Gelatin—gave the contractors real blasting efficiency and economy.

Before your next blast, why not go over your specific problems with your Atlas representative.

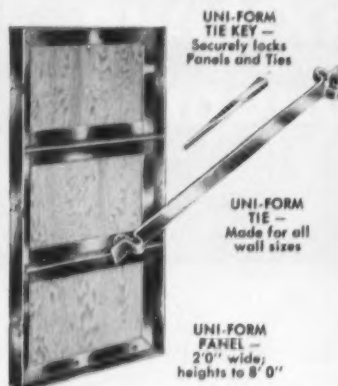
He'll help you get the most out of your blasting methods, your explosives, and your caps. And get "Better Blasting"—Atlas' informative newsletter on latest methods and materials. Write us to put your name on our mailing list today.

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UNI-FORMS provide faster, simpler and easier circular wall forming . . . one side alignment and bracing . . . absolute control of concrete, and safer, cleaner working areas.

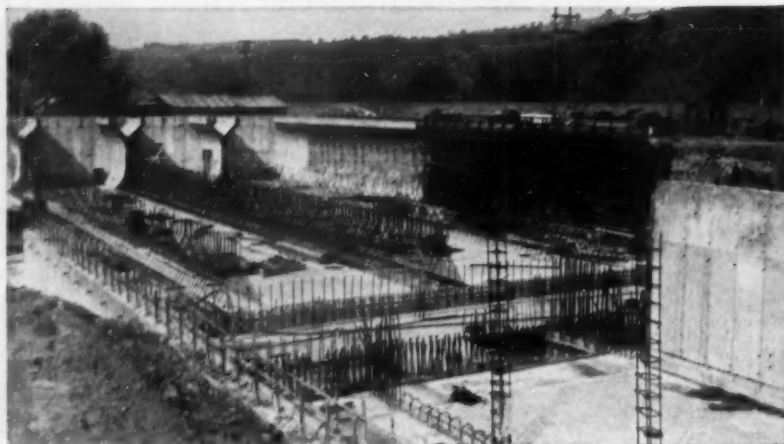
Write for the
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Chicago 51, Illinois



Unique Prefab Form System Speeds Sewage Plant "Y" Wall Construction



MECHANIZED FORMING with new "Y" wall trusses and UNI-FORM Panels speeds construction, saves labor and material

Field reports on a new system for forming "Y" walls in aeration tanks and settling basins indicate very satisfactory operation and important labor and material saving advantages for the system.

Developed by the Universal Form Clamp Co., Chicago, the new system is said to completely eliminate the many problems and difficulties encountered by contractors in forming this special type of wall in sewage disposal plant construction.

Specially designed trusses, which can be made to handle any type, height, shape or wall thickness, are used in conjunction with standard UNI-FORM Concrete Forms to form the "Y" wall. Assembly of the truss and UNI-FORM Panels into a complete form, ready to receive concrete is a fast, mechanical operation. Positive internal spreading and accurate wall thicknesses are assured by the use of Universal Spiroloc Cone Nut Assemblies.

Features incorporated in the design and operation of the Universal "Y" wall form-

pieces or as a large unit. Both methods have been very successfully used on recent projects.

Because standard UNI-FORM panels are used to form a large percentage of the "Y" wall contact area, it is possible to strip all UNI-FORM panels within a very short time after the actual pouring of concrete, leaving the trusses in place to provide the necessary support for the required period of time.

In this way, faster forming cycles, using minimum UNI-FORM equipment are pos-



ASSEMBLED SECTION of "Y" wall truss with UNI-FORM Panels



STRIPPED WALLS are clean and accurate. The stripping system eliminates the necessity of additional lumber or tying devices for the alignment and bracing of the unit.

Erection, stripping and movement of the form can be handled either as individual

sible, resulting in lower labor and material costs. UNI-FORM Panels are rented or sold, or rented with an option to purchase.

For complete details on Universal "Y" wall forms and UNI-FORM Panels, Write:

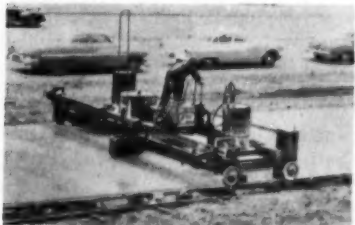
UNIVERSAL FORM CLAMP CO.
1238 North Kostner Avenue
Chicago 51, Illinois

Distributors and Branches in Principal Cities

with one-finger control. Maintenance is simple because the saw has few moving parts. The blade can be changed in 30 sec and sharpened on the job in less than 10 min. Another time saver is the automatic rewind starter that turns over the gasoline motor in any temperature.—Wright Power Saw Div., 410 S. 3rd St., Louisville, Ky.



NEW MOTO-BUG—A relatively simple automatic power flow transmission is said to provide increased speed, power and capacity for the Kwik-Mix Co.'s model R-15 Moto-Bug, a versatile material handling unit. The transmission is said to correct power flow output automatically in direct ratio to power requirements without shifting or using a clutch pedal. Speed of the Moto-Bug has been increased to 12 mph. With a full load of 2000 lb, the Moto-Bug can negotiate grades up to 25%, an increase of 50% over previous ratings for the unit.—Kwik-Mix Co., Port Washington, Wis.



AUTOMATIC SPRAY CURING—General Road Machines' new curing rig travels along the form line behind the finisher and automatically sprays wax or resin-based materials or white-pigmented curing compounds in uniform layers. The machine has a single, track-mounted spray head that passes transversely across the surface at speeds of from 5½ to 30 fpm. Powered by a 12-hp, two-cylinder air cooled engine, the machine is mounted on frames adjustable in

How Blackhawk Jacks Speed Pre-stressing



100 TONS OF FORCE FROM "PORTO-POWER" remote control jacks are the practical answer for pre-stressing concrete beams. Above — two Blackhawk hydraulic pumps transmit oil under pressure to rams — each of which can exert 50 tons of jacking power. Using an "I" beam as a crosshead, the rams are tensioning the cables after the girder is in place. Other "Porto-Power" jack sizes include 4, 7, 10, 20-ton capacities.

How "Porto-Power" jacks speed construction



Pull pulleys, wheels, gears. No damaging hammering and prying. Safe.



Straighten buckets — tons of force where you want it to push out bashes.



Straighten dented dump trucks — make repairs on the site to cut downtime.



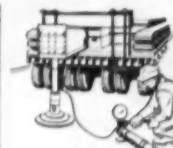
Bend pipe the easy way. Equipment handles all popular pipe, conduit.



Toe-lifting heavy equipment. Easy with "Porto-Power" Ram, Toe Lift.



Pre-stress concrete girders, bridge slabs. Gauges measure exact pressures.



Test soil, road surfaces for weight bearing capacities; gauge shows load.



Do rescue work with hydraulic power that lifts, pulls, spreads, saves lives!

PREVENT COSTLY DOWNTIME — speed up construction in *hundreds* of ways! Above uses of Blackhawk "Porto-Power" are only a sampling. Maintenance is faster, easier . . . cutting downtime from hours to *minutes*. And only Blackhawk builds the *complete* line of hydraulic tools and attachments to answer needs for pushing, pulling, clamping, bending, spreading and pressing with tons of versatile power. See your Blackhawk construction equipment distributor *today*. Or write for free catalog H-201 — it's full of cost-cutting hydraulic power *ideas*!

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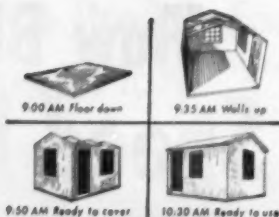
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EQUIPMENT NEWS . . . Continued

widths of 10 to 15 ft or 20 to 25 ft. Ball and roller bearings are used throughout and steering clutches are standard. Single or double-flanged, or rubber faced track wheels are available. The spray head, driven by a hydraulic motor through V-belts and a roller chain, travels the full width of the machine. Traversing cycles can be set automatically for from 1 to 10 per min. A transmission provides three speeds both forward and reverse. The stainless steel spray nozzle is protected by windshields—**General Road Machines, Inc., Niles, Ohio.**



DIESEL HAMMERS—Manufactured in Germany and used extensively in Europe since 1938, Delmag diesel pile hammers recently have been introduced in the U. S. Besides being much lighter than steam hammers of equivalent size, the self-contained diesel hammers eliminate the need for boilers or compressors, are easy to transport and set up, have few moving parts, and use little fuel. They are designed so that they can be used with converted steam hammer leads. Hammers are available in 9100, 22,500, and 39,700-ft-lb capacities, with ram weights ranging from 1100 to 2485 lb. Manufactured by the Delmag Machine Works in Germany, they are available from **The Foundation Equipment Corp., 100 Elizabeth St., Newcomerstown, Ohio.**

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NEW TRACTOR LINE—Massey-Harris-Ferguson, Inc., has introduced a new line of small and medium sized utility tractors in the 34 to 52-hp class. The line consists of three competitively-priced wheel tractors, a rear-engined fork lift unit, and a rear-engined shovel-loader manufactured by Mid-Western Industries, Inc., but marketed by M-H-F. Mid-Western, manufacturer of the Davis line of tractor attachments, will develop 20 hydraulically controlled front and rear-mounted attachments for the M-H-F tractors, which are

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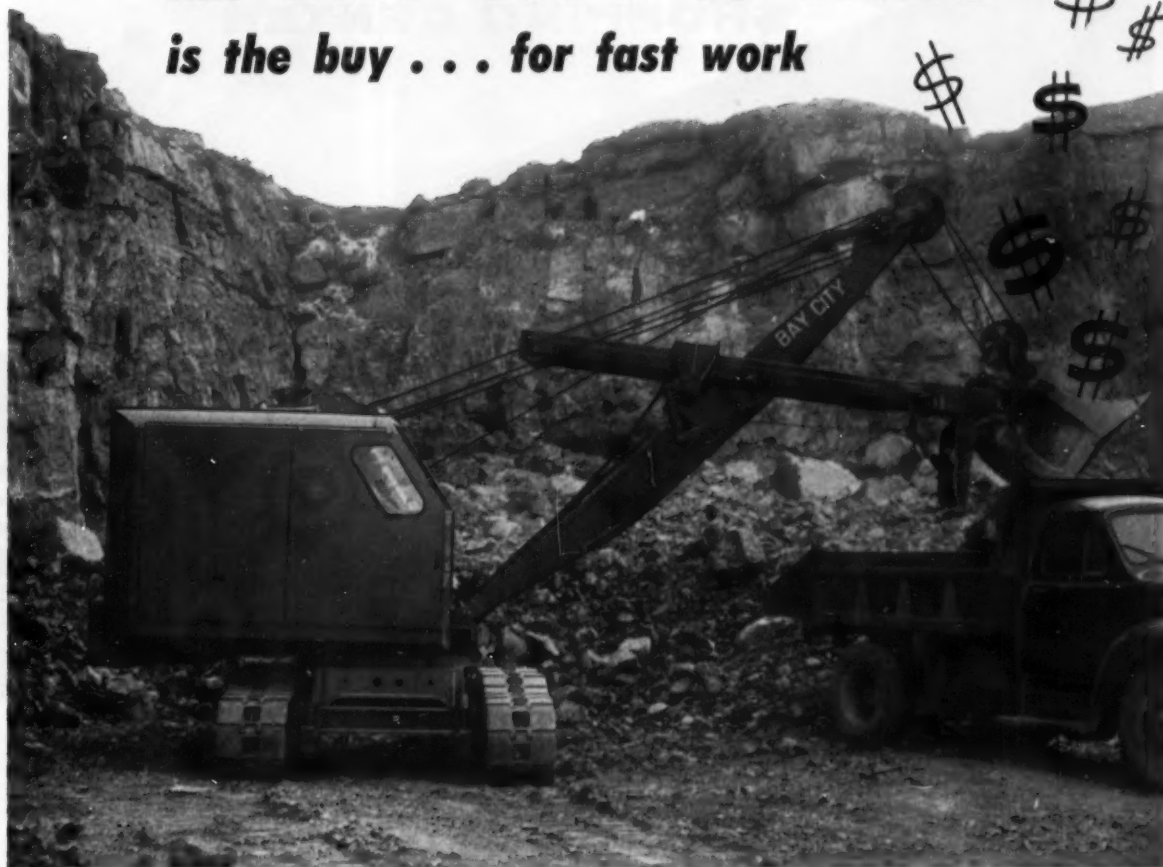
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Time after time, contractors, highway depts. and other MILLER Tilt-Top owners tell us they've put 50,000 miles (and more) of tough usage on their Tilt-Tops without a single repair! Such trouble free performance is no accident—it begins with engineering for overloads in every member—rigid inspection of each electric weld, use of long life, precision, Timken roller bearings on axles and walking beam shafts, carefully selected, two-inch oak decking, and first line tires. Best of all . . . you pay no premium for quality . . . even on first cost! See your MILLER distributor today—and compare!

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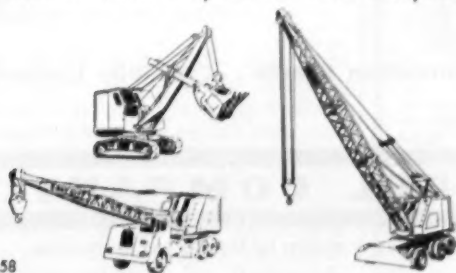
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called Work Bulls. The model 202 has a 134-cu in. engine that develops 34 hp. The unit features good over-the-hood visibility, road speeds up to 15 mph, dual range transmission with 6 speeds forward and 2 in reverse, individual rear-wheel brakes, hydraulic controls and power steering. The model 303 has a 208-cu in. engine that delivers 42 hp. It has an in-line transmission, with a top speed of 15 mph, that delivers 5 speeds forward and reverse. The 303, which takes a $\frac{3}{4}$ -yd loader, has worm-and-sector steering, gear-driven differential, and a heavy-duty clutch. The 404 Work Bull, with a 277-cu in. engine, delivers 52 hp. It features a five-speed transmission, hydraulic controls for both tractor and attachments, heavy-duty front axle and support, gear-driven differential, full-pressure lubrication and optional power steering. The fork lift unit is the model 202 tractor in reversed position so that the load is over the large drive wheels. A torque converter, power clutch and optional power steering highlight the Davis Pit Bull, Mid-Western's shovel-loader, which handles a wide variety of attachments. Other features include a 42-hp gasoline engine, and reversing clutches that permit direction changes without shifting. Attachments available for the M-H-F line include back hoes, loaders, fork lifts, graders, angle-dozers, snow plows, sweeper-brooms, post hole diggers, rotary trenchers, and pipe and cable layers—Massey-Harris-Ferguson Inc., Quality Ave., Racine, Wis.

RUGGED WELDERS—Two new gasoline engine-driven welders, both with battery start and direct coupling between engine and generator, have been built for rough service. Available in 300 and 400-amp models, they have heavy steel frames and have no projecting generators or controls that could be damaged on the job. Both weld-



HERE'S HOW CARCO WINCHES KEPT A BIG CONSTRUCTION JOB MOVING!

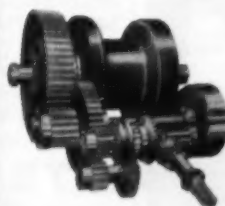
Mired in sticky, blue clay encountered in clearing and grading for the Canadian National Railways, the right of way for a completed 43-mile rail line from Terrace to Kitimat, B. C., is an International TD-24. Campbell-Bennett, Ltd., of Vancouver, B. C., the contractors, met this emergency by winching out the stuck equipment with a Carco model J winch.

Over miles of this mucky clay, tractors were unable to get traction sufficient to push the load in dozing. To solve this problem, two TD-24's with Carco model J winches were anchored back to back on solid ground and attached to a middle tractor by the Carco winch lines. By doubling tractor pulling power, the two Carco winches were easily able to pull the middle tractor back and forth with the blade in play.

Many heavy-construction contractors have found it pays to have one or more tractor-mounted Carco winches on every project in order to overcome the problems and emergencies that slow up construction schedules. You'll find a Carco winch will pay, too. See your nearest Carco dealer for further facts. PACIFIC CAR AND FOUNDRY COMPANY, Renton, Washington. Branch at Chicago, Ill.



The self-energizing, free-wheeling brake of the Carco model J winch gives full braking power with instant automatic operation. The brake takes effect the instant tractor clutch is disengaged, holding load firmly in desired position.



The constant-mesh, 4-stage gear train doubles tractor pulling power by a high ratio of gear reduction. A lower gear ratio in reverse provides faster speed for paying out line. Heavy-duty gears and shafts assure large overload capacity.

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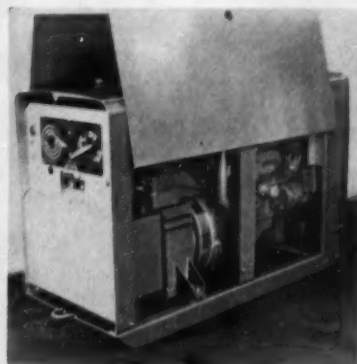
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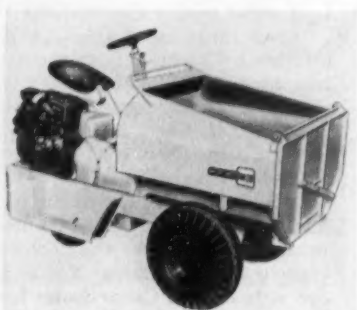
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EQUIPMENT NEWS ... Continued



ers are driven with Hercules JX4 engines, rated at 54 hp at 2,150 rpm. The 300-amp unit, above, has a welding range of 60 to 375 amps, and electrode capacity ranging from 3/32 to 5/16. The 400-amp welder has an operating range of 80 to 500 amps, and electrode capacity of 1/2 to 3/8. Both the 300 and 400-amp models have a duty cycle of 60%, rated temperature rise of 50 C, open circuit voltage of 80, and operate at 2,150 maximum rpm. Both two and four-wheel trailers are available.—Welding Dept., General Electric Co., Schenectady 5, N.Y.



HAS TORQUE CONVERTER—

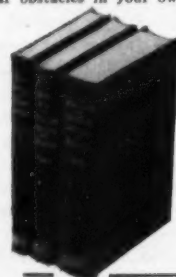
Prime-Mover's new 18 cu ft, 1 1/2-ton capacity construction materials handling truck is said to be the first of its type to be equipped with a hydraulic torque converter. The new truck is powered by a 15-hp, air cooled Wisconsin engine that is directly coupled to a transmission consisting of a three-element torque converter and directional change clutches. Engine and transmission are coupled to the differential with an automotive-type drive shaft. No belts or chains are necessary. Operation of the new truck is safe and simple: the operator sets the directional change lever at either forward or reverse and then presses the accelerator to

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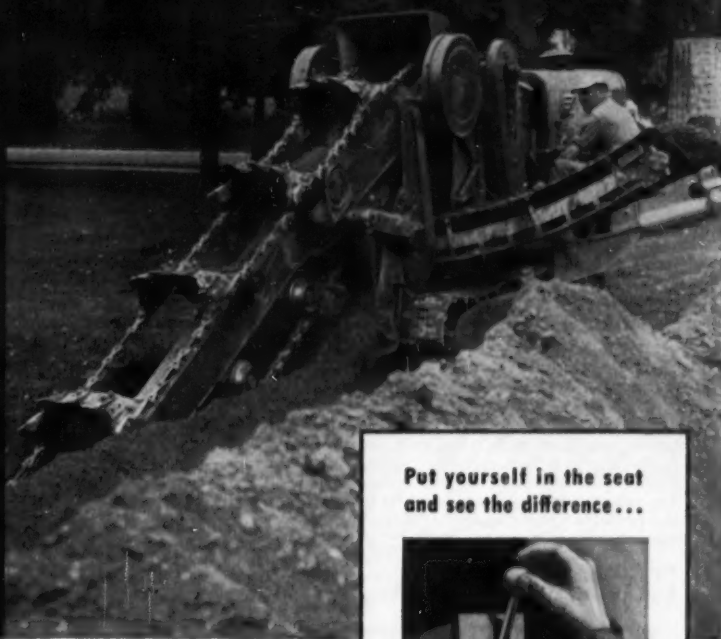
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Gar Wood-Buckeye's 407 ditcher is far easier to operate, control and adjust than any other ladder-type ditcher in its class. Here's why:

Streamlined and compact, the 407 has the smallest practical dimensions for the widest range of applications. Lowest overall height, 7 feet 3½ inches, for easy transport without disassembly. It's exceptionally easy to maneuver in close quarters . . . digs neat, clean ditch right up to walls and foundations. Also digs in reverse for tunneling and undercutting. The boom on the 407 is raised, lowered and held by an independent, live hydraulic system. You get fast positioning with positive down-pressure.

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PUSH-BUTTON CONVEYOR SHIFT speeds work around obstructions. Just push the button to shift conveyor electrically while digging! No need to stop machine.



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Intense heat no problem for Super Belts

This hydraulic press at Hackney Iron and Steel Co., Enid, Oklahoma, shapes red hot steel plate into tank heads. The flat leather belt formerly used on this type of press, would stretch, slip, and come off. Tightening the belts only overloaded the bearings. For this press, a Gates Super Vulco Rope drive was chosen because it withstands the near-by intense heat, and its extra horsepower capacity permits lighter weight sheaves; thereby reducing load on bearings.

Claude King, maintenance superintendent, reports: "This Gates V-belt drive has operated 8 hours a day for 5 years without lost time due to maintenance."

Super Belts on vibrator last 7 times longer

James Gann, general superintendent of John B. LaGarde, Inc., Anniston, Alabama, reports:

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"With Gates Super Vulco Ropes, we get about 7 times the average life we received from any other make. It is hard to believe that belts can take this punishment, but Gates Super Vulco Ropes do it."

Solve tough drive problems with this super tough V-belt

If present V-belts are wearing out too fast... if heavy shock loads... oil and heat... or other conditions are causing too frequent replacement... here's the answer:

Gates Super Vulco Rope—the oil and heat resistant V-belt with 40% more horsepower capacity. Easily handles heavy shock loads.

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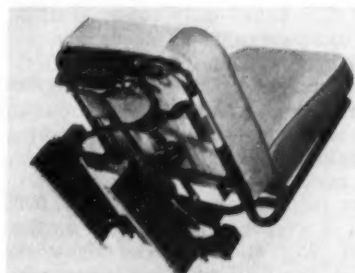
TPA 104

Gates SUPER VULCO ROPE Drives

move and the brake pedal to stop. Standard beds for the new truck include an 18-cu ft bed with a sliding endgate, swinging tailgate, and dumping controls to accommodate any rate of load discharge. Over-all width with the bed is 42 in. and over-all length is 88½ in. The truck is 42 in. high.—**The Prime-Mover Co., Muscatine, Iowa.**



ROCK BREAKER—The Bros Preparator, a new in-place rock breaker, reduces native rock to 2-in. aggregates right on the roadbed. The Preparator has 22 free-swinging hammers mounted on a common shaft that are driven by poly V-belt drive direct from the engine. The hammers, of special alloy steel, have given up to 1,000 hr of service before having to be replaced. The Preparator is also designed to pulverize old blacktop paving for re-use. The Preparator can be drawn by any tractor with 30 or more hp. Best towing speed is 1-1½-mph. The unit is available with either a gas or diesel engine.—**Road Machinery Div., Wm. Bros Boiler & Mfg Co., Minneapolis, Minn.**



SAVE THE OPERATOR—A new seat for trucks and tractors, called the Level Ride 80, uses a torsional rubber spring suspension system to soak up shock so that the vibrations of erratic pitches and jolts are not transmitted to the operator. The secret is a rod with a calibrated gage that adjusts the tension on

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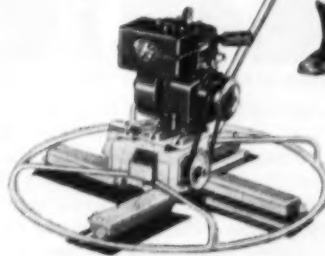
The new Kelley HYDRA-TROWEL duplicates the quality of hand-finishing yet does the work faster than hand-troweling and without the back-breaking drudgery. Low center of gravity and perfect balance make operation amazingly easy. There is none of the objectionable gyrating produced by power trowels with high centers of gravity. Four dual-purpose blades are used for both floating and finishing. Blade pitch is adjusted by finger-tip control on handle. Other HYDRA-TROWEL features include stationary guard ring for carrying machine, trouble-free gasoline engine with heavy-duty centrifugal clutch, and a long handle with grips widely spaced. Ask for demonstration and be convinced. Additional details and name of nearest distributor on request.

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WATER COOLED AC POWER-AC WELDER . . . a dual purpose welder that can be used for operating electrical equipment, or for AC welding independent of power lines.

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ELLIS Beam and Column Clamp



USE IT AS A COLUMN CLAMP . . .



USE IT AS A BEAM CLAMP

This clamp, without change, may be used for beams, columns, on top of walls to eliminate one or two rows of snap ties, pilasters, curbs, etc. The clamp automatically squares the column, beam, or other member on which it is used. It eliminates over 80% of all cleats, stringers, and other framing for beams, columns, and pilasters . . . only 3/4-inch plywood and the clamp being required. The ELLIS Beam and Column Clamp locks the two beamsides and bottom together as a unit, so that shores under the beams may be spaced farther apart. It adjusts from five inches up to thirty inches.

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EQUIPMENT NEWS . . . Continued

the springs to the weight of the individual driver. Weight adjustments from 100 to 275 lb are provided, as well as 4 in. of forward and backward movement, and 2 in. of vertical movement. In addition, changes can be made in seat depth, and seat and back angles so that the operator can change his position to relieve tired muscles.—**Bostrom Mfg. Co., 133 W. Oregon St., Milwaukee, Wis.**



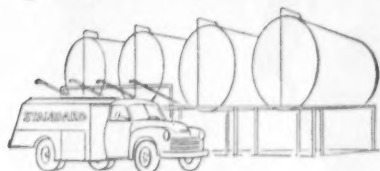
ROTARY DRILL—Mounted on a Caterpillar D6, the Portadrill Model 6TA heavy-duty rotary drill is a complete unit that needs no auxiliary power equipment. All power is supplied by the tractor engine through a heavy-duty transfer case. Two rotary compressors, operating singly or together, provide a maximum of 85 psi air pressure for cuttings removal. Up to 27,000 lb of weight can be applied on the bit. With standard 9-in. cone rock bits, the drill averages a ft a min in most formations. Two men operate the rig easily, and one man can complete shallow holes alone. Controls are mounted at the rear of the drill where the operator has full view of drilling operations.—**Winter-Weiss Co., 2201 Blake St., Denver 5, Colo.**

(Continued on page 191)

Cold facts about buying fuels, motor oils and greases

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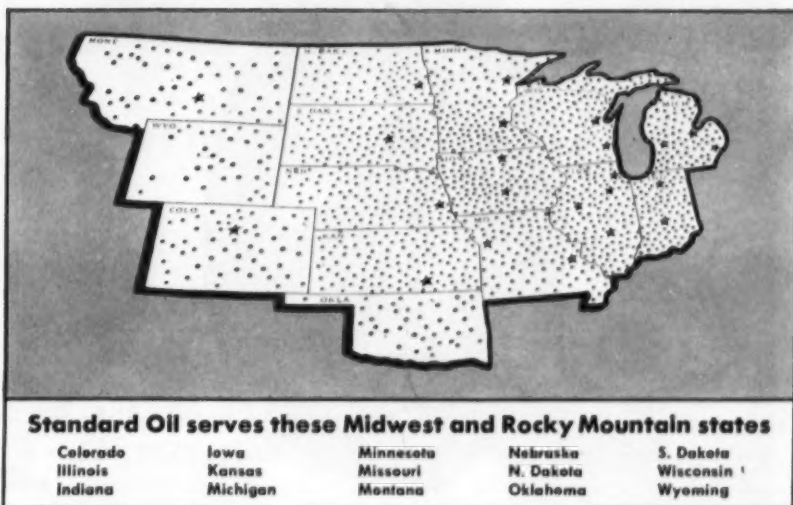
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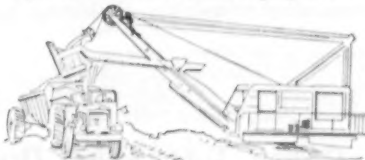
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Kansas
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N. Dakota
Oklahoma

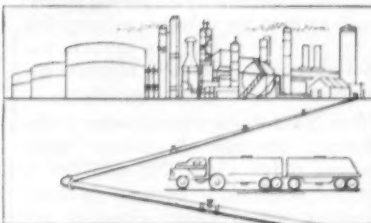
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All Standard Oil fuels, lubricants and greases are made by Standard and delivered to you by Standard Oil employees, with Standard's own distribution system. Everywhere you go in the Midwest and Rocky Mountain

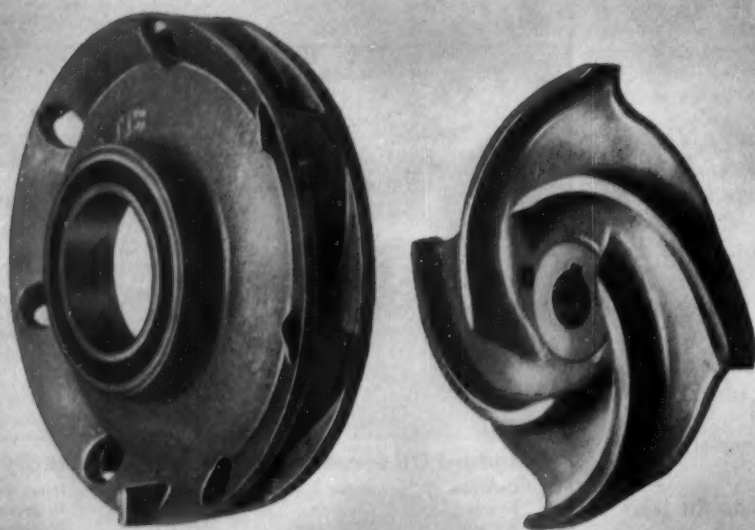
states there is a Standard Oil owned and operated bulk plant within a few miles. You deal with one company. Every Standard Oil supply point is equally and uniformly well run.

How to get in touch

Because Standard Oil lubrication specialists so thoroughly cover their territory, you can depend upon meeting your man at any important contract letting—if you haven't already met him. If you miss him, look in the telephone directory of any town—no matter how small—nearest your job. You'll find the Standard Oil bulk plant listed under the Standard Oil name. If you still miss, sit tight, the Standard Oil man will be around to see you *before* you need him and he will be ready to serve you starting right then. If you would like more information right now, write or call Standard Oil Company, 910 S. Michigan Avenue, Chicago 80, Illinois.



STANDARD OIL COMPANY
(Indiana)



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Modern "Diffuser" Pumps Rebuilt Easily, Rapidly, Inexpensively

Metal parts in any pump will wear after hard service, particularly when handling suspended sand or abrasive solids. Therefore, economical rebuilding is essential. In diffuser-primed pumps, rebuilding is accomplished by replacing two simple parts — the diffuser and the

impeller. It is not necessary to replace the expensive pump casing. Full factory efficiency is restored with the replacement of these parts. Replacement of the diffuser and impeller is easy and the parts are inexpensive and readily available.

Diffuser-primed pumps are the only contractor's pumps which offer this cost-saving advantage and also provide the other two essential requirements of self-priming pumps: quick priming action and clog resistance.

Quick priming is obtained in Marlow Contractor's Pumps because the diffuser provides a multiplicity of priming points. Each vane in the diffuser performs this function. With at least six vanes in the Marlow pump, it tends to separate air faster, thus priming more rapidly.

When a Marlow is primed, water is discharged through all diffuser ports around a full circle. Dirt and debris cannot accumulate because its 360° cleaning action clears clogging accumulations at the base of the pump casing. There are no dead segments to hold muck and silt which reduce pumping efficiency.

Diffuser-primed pumps are fast priming, resistant to clogging and economical to rebuild... and only a Marlow pump is diffuser primed. Ask your dealer to show you Marlow Contractor's Pumps and the two inexpensive replacement parts. They mean better pumping and greater economy to you.



This is "diffuser priming." Note the 360° cleaning action and the "multiple point priming."



MARLOW PUMPS

Division of Bell & Gossett Company

MIDLAND PARK, NEW JERSEY

Morton Grove, Illinois

Longview, Texas



SELF-PROPELLED CRANE—The Little Giant 1/2-yd crane, selling for \$14,900 fob factory, features hydraulic steering, hydraulic power brakes, and two-speed four-wheel drive. Designed specifically for crane or shovel work in cramped quarters, the model SPA crane will turn in less than a 60-ft circle. It's jack shaft, swing shaft, and cable drum shafts all rotate on Shafer Convalex roller bearings sealed for life. The upper mechanism is mounted on Little Giant's patented ball bearing turntable.—**Little Giant Crane & Shovel, Inc., Des Moines, Iowa.**



SELF-CONTAINED HORN—A portable, self-powered signal horn gives off a blast that compares with that of a diesel engine horn—116 to 122 decibels at a distance of 25 ft. Called the Big Bertha, the horn is powered by carbon dioxide. It can be heard for 1/2 mi. under normal conditions. The standard model consists of a 15-lb steel cylinder of carbon dioxide, a 13-in. horn, special diaphragm and valve assemblies, and a pressure gage. The unit is 31 in. long, weighs 40 lb. It produces 250 5-sec blasts before requiring recharging. — **Falcon Alarm Co., Inc., Summit, N.J.**

(Continued on next page)

—**DRIVE-IT**[®]—**330**

CARTRIDGE-POWERED STUD DRIVER

SAVES TO 80% FASTENING TO CONCRETE OR STEEL

Construction and maintenance men, nationwide, are cutting costs with DRIVE-IT powder-actuated tools. Does 15 minutes work in 15 seconds. Users report time and money savings up to 80% over drilling and other outmoded methods. Electrical, heating and ventilating, plastering, general construction—wherever anything must be fastened to concrete or steel, DRIVE-IT tools are money-makers for their users.

Exclusive DRIVE-IT Advantages

- 1. ONE POWER LOAD.** Only one strength power load needed—whether concrete is soft or hard. No need to buy several strength loads.
- 2. LIGHTWEIGHT and EASY-OPERATING.** The DRIVE-IT 330 weighs less than 6 pounds, is only 13 inches long. One motion opens or closes breech. Automatic cartridge ejection. Trigger-operated.
- 3. SAFE.** Large safety pad plus built-in safety mechanisms protects operator. Tool must be depressed against work surface before trigger can be pressed. Can't be fired accidentally.
- 4. VERSATILE.** Standard 1/4-inch barrel can be replaced easily with 3/8-inch barrel for driving larger studs. Uses same low-cost power loads. Over 50 types and sizes of drivepins available.

**DRIVE-IT Dealers
Are Fastening Experts Who
Give on the Job Service**



SEE YOUR DEALER OR MAIL COUPON FOR A DEMONSTRATION

OMARK INDUSTRIES
(Formerly POWDER POWER TOOL CO.)
5001 S. E. Johnson Creek Blvd.,
Portland 6, Oregon

- ☐ Send literature on DRIVE-IT tools.
☐ I want a free DRIVE-IT demonstration.

Name _____

Address _____

City _____ State _____

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COMMENT

from the
BUTLER ENGINEER

... of traffic tangles
and racing 34E pavers

Overheard at the Ready Mixed
Show:

"So you want me to cut my price? Look, this equipment will pay you a profit for years to come. I only make a profit on one sale—and you want to cut me out of that!"

The other day I drove from Waukesha to Milwaukee. Had to slam on my brakes to dodge a truckload of concrete block swinging out of a block plant (a Butler customer). In back of me (and he hit his brakes) was a transit-mix truck from a Waukesha ready mix outfit (another Butler customer). After I swallowed my heart I started to pass the block truck but had to swing back to avoid a transit-mix truck from Company Y in Milwaukee (another Butler customer). All right, don't believe this: booming along in back of Y's truck was another transit-mix owned by Z (another B-c.). Kind of a concrete traffic problem!

With the Butler 0-1-0 one-man-operated Roadbuilders' Plant I rather thought we had reached a pretty ultimate high for production. Now comes the idea of adding an aggregate bin for one size of stone (pre-set controls and automatically batched of course). Such a set-up would play ring-around-a-rosy with THREE 34E dual drum pavers.

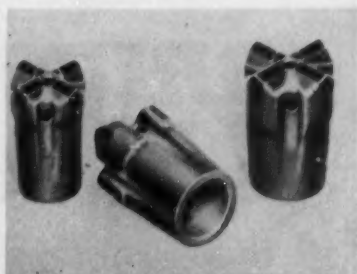
Butler Automatic Batching (roadbuilders, ready mix or concrete products) will not do certain things. It won't mix baby's formula wash the dishes polish your car but it will make you such a happy, handsome profit you can hire those jobs done.

Stay healthy, wealthy and you won't need to be wise

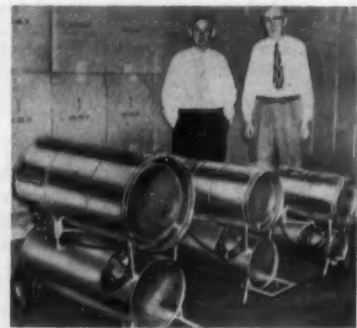
The Butler Engineer

BUTLER BIN COMPANY
WAUKESHA, WISCONSIN

EQUIPMENT NEWS ... Continued



TAPER-SOCKET ROCK BITS—A new line of taper-socket type Brunner & Lay rock bits is available in the following gage sizes: 1¼, 1½, and 1½-in. #7 class A taper for ¾-in. drill steel; and 1½ and 1¾-in. #8 class B taper for 1-in. drill steel. The taper-socket feature eliminates stripped threads, prevents body distortion caused by lock-on, and makes bit removal from the drill rod easy. Bronze shims are supplied with each bit.—Brunner & Lay, Inc., 9300 King St., Franklin Park, Ill.



PORTABLE HEATERS—The 1956 line of Silent Glow portable heaters produce from 120,000 to 300,000 btu's of recirculating heat. The new heaters, called the Cub line, are available in three models. The model 120, which delivers 120,000 btu, is only 36 in. long, 15 in. wide, and 27 in. high, and weighs 98 lb. The model 200, delivering 200,000 btu, is 43 in. long, 18 in. wide, and 31½ in. high, weighs 150 lb. Model 300, with a delivery rating of 300,000 btu, is 44 in. long, 21 in. wide, 39 in. high, and weighs 195 lb.—Silent Glow Oil Burner Corp., Hartford, Conn.

CONCRETE WORK

Any contractor who does concrete work will find CM&E's series of articles on Concrete Mixing and Placing useful. Single reprints cost 50¢; the price for 10 copies or more is 40¢ each. Address your order to the Editor.

We challenge you
to find better
PROTECTIVE CLOTHING!



illustrated
above:
¾ length
coat

Sawyer

For every industry where personnel protection and safety are vital, only Sawyer Neoprene Latex Clothing offers all these advantages:

- 100% protection against oils, chemicals, alkalies, abrasion — and other hazards!
- "Exclusive Coating Process" ... (for years and years of extra wear and durability) — original with Sawyer!
- guaranteed not to peel, blister or crack in ordinary usage!
- double interlocked sewn seams that can't come apart!
- solid brass or non-conductive fastenings that can't rip off or corrode!
- designed for roomy, action-free comfort!

Sawyer clothing also Rubberized or Oiled. Full range of jackets, pants, coats, hats, aprons for more efficiency, more economy, more protection on every job!

Make us prove it!

Send for complete details and price list.
The H. M. Sawyer & Son Company
A Division of Sawyer-Tower, Inc.
specialists in Protective Clothing for more than a century
9 Thorndike St., Cambridge 41, Mass.



Push-loading scrapers is one of many profitable Tractor Dozer applications. Unit here is working on relocation of Arkansas Highway No. 1.

Before you buy any dozer...

Check Michigan Tractor Dozer's 27 mph speed power-tilting bowl, full-time four-wheel traction

If you're in the market for any kind of dozer, be sure to check the new MICHIGAN Tractor Dozer before you buy. This job-proved unit dozes $2\frac{3}{4}$ cubic yards per pass. Its turbo-charged diesel engine develops 165 hp, with maximum rimpull of 28,000 lbs.—plenty for heavy-dozing, land-clearing, or push-loading. At 27 mph, it runs rings around any dozer on the market!

Full traction while turning. All four wheels of the Tractor Dozer are *always* driving, except when you declutch rear axle for highway travel. Rear-wheel steer eliminates unnecessary tire wear—you don't brake or drag inside wheels on turns. If one wheel begins to slip, a locking differential automatically applies power to wheel with firmest footing.

High flotation tires, oscillating axle.

Big low pressure tires give the Tractor Dozer excellent ground contact in wet, dry, or sandy footing. You can cross railroad tracks or travel along ties or road bed; you can climb curbs and drive safely on any kind of road surface. On uneven terrain, the steering-wheel axle oscillates to keep both rear wheels in firm contact with the ground. With $14\frac{1}{2}$ inches of

ground clearance, it's practically impossible to get "hung up."

Power-shifting, 300% torque multiplication. Clark's power-shift transmission eliminates the conventional engine clutch and foot pedal—the most notorious cause of excessive maintenance and operator fatigue. With two fingertip levers on the steering column, operator can instantly shift between High-Low and Forward-Reverse—even when moving in either direction.

The 3-to-1 Clark torque converter gives a steady power flow, regardless of speed. As load gets heavier, torque output automatically increases up to 300% at stall speed—gives the extra torque to plow through the roughest spots. You can't stall the engine, and there's no clutch to slip.

Power-tilting bowl. Powerful double-acting hydraulic cylinder tilts bowl back and forth through 33 degree arc. You can change angle of bowl from "dig" to "float" as you work . . . move cutting edge back and forth to uproot stumps and boulders. Two 6-inch lift cylinders give tremendous lifting power and down-pressure—cutting edge raises from $24\frac{1}{4}$

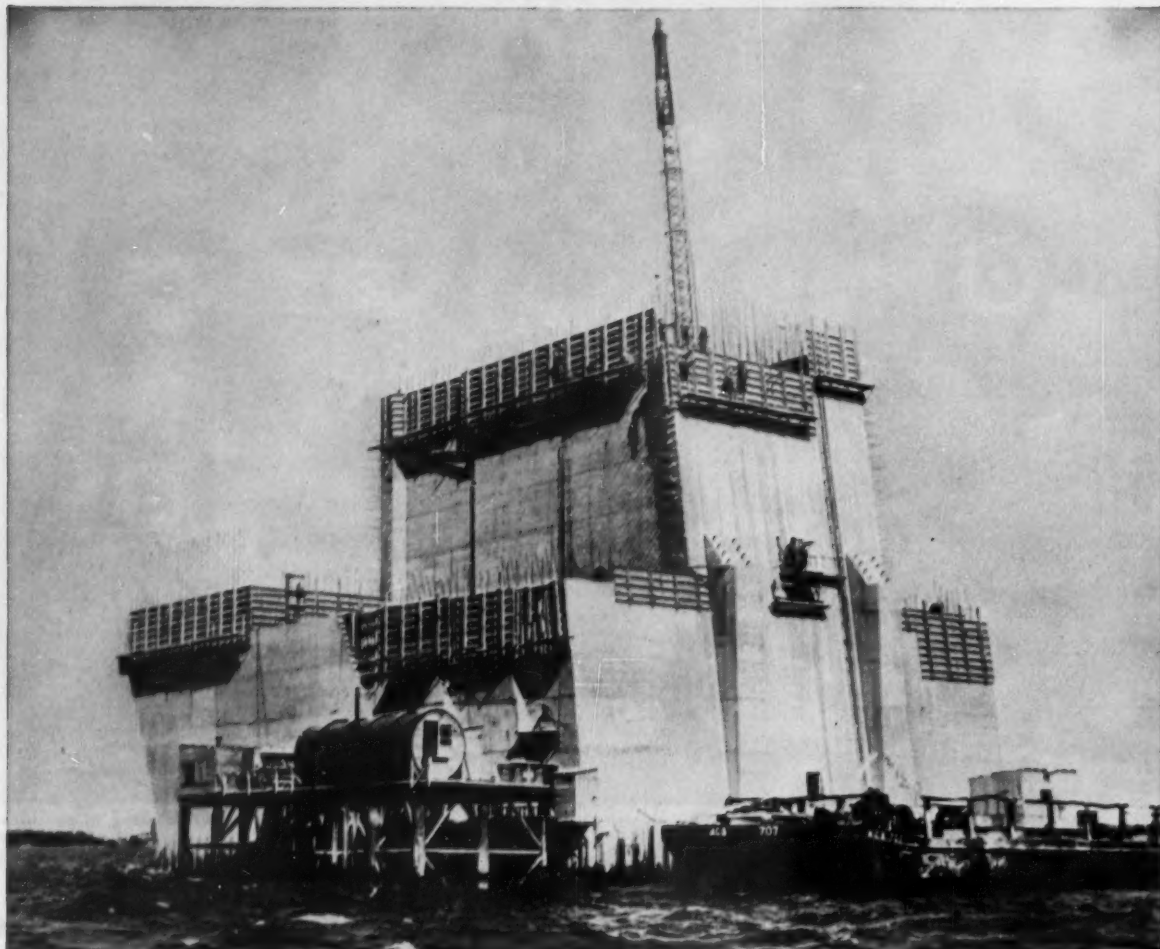
inches below ground level to $43\frac{3}{4}$ inches above.

See Tractor Dozer in action—on your job. Write us to arrange a demonstration. You pick the work . . . then time cycles, measure output, compare price per yard of dozing capacity (don't forget MICHIGAN's f.o.b. price includes power-shift transmission, torque converter, planetary-wheel axles, and power-tilt blade . . . you don't have to pay for "extras" to get top efficiency). Or, if you'd like more details, before taking the time to watch a demonstration, ask us to show you a 20-minute color movie of the Tractor Dozer. No obligation, of course.

CLARK EQUIPMENT COMPANY
Construction Machinery Division
2403 Pipestone Road
Benton Harbor 38, Michigan

Michigan is a registered trade mark of

CLARK®
EQUIPMENT



Blaw-Knox steel forms help solve tough concreting problem on world's longest suspension bridge

Merritt-Chapman & Scott Corporation Make Largest Single Concrete Pour in One Day

When it was decided to place the 450,000 cu. yds. of concrete in the substructure for the Mackinac Bridge by the Prepakt method, special steel forms had to be designed to withstand pressures much higher than usually encountered on concrete construction projects.

Blaw-Knox Steel Form engineers were asked to design such forms by Merritt-Chapman & Scott, contractor for the 33 piers of the substructure. The Blaw-Knox engineers developed a series of form sections 10'6" high, consisting of four panels. After the first pour had set, the forms were moved up so that the bottom panels overlapped the set concrete. This permitted 7'10" pours from then on.

The combination of Merritt-Chapman & Scott's ingenuity, the specially designed Blaw-Knox Forms, and the method of pouring the concrete, has resulted in record concrete placing . . . 6250 cu. yds. in one 24-hour period . . . 33,068 cu. yds. in 7 days . . . 103,107 cu. yds. in 30 working days.

When you have a concreting problem . . . whether it is a bridge, big dam, tunnel, retaining wall or sewer . . . it will pay you to take advantage of Blaw-Knox forming experience. Blaw-Knox has probably solved similar problems for other contractors who call in the Blaw-Knox Steel Form Consultation Service in the preliminary planning stage, *before* the plans are drawn.

Blaw-Knox Steel Forms Consultation Service is available to any contractor without obligation. Write, wire or phone today.

STEEL FORMS CONSULTATION SERVICE **BLAW-KNOX COMPANY**

STEEL FORMS DEPARTMENT • BLAW-KNOX EQUIPMENT DIVISION
P.O. BOX 1198 • PITTSBURGH 30, PA. • TELEPHONE STERLING 1-2700



New Publications

These catalogs and bulletins from manufacturers contain useful information about construction equipment and materials. To obtain a copy, write directly to the manufacturer at the address given.

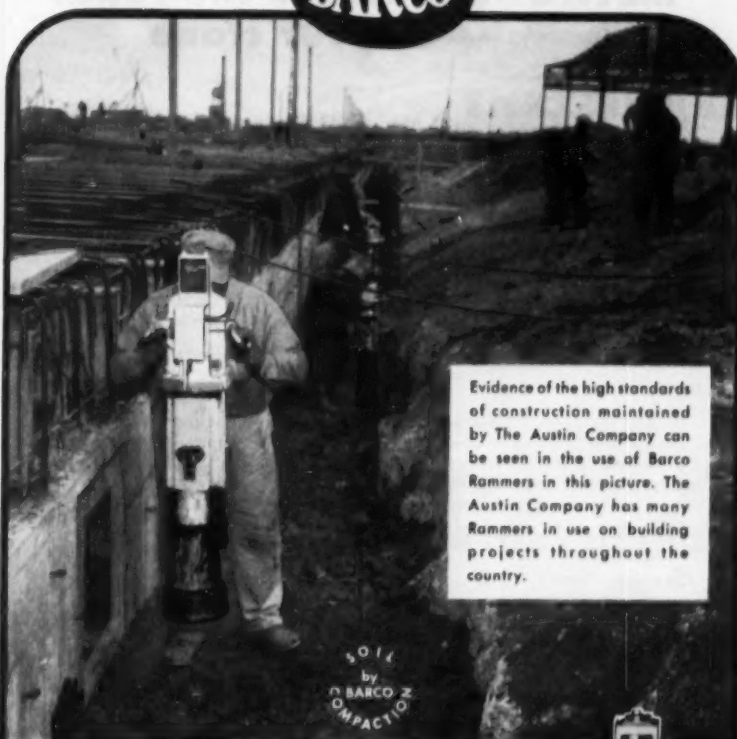
TRUCK RESTRICTIONS—A handy pocket-sized compilation of the road laws of all 48 states and the District of Columbia, including truck and trailer size and weight restrictions, is now available from the Four Wheel Drive Auto Co. This is the 25th revision of the booklet by FWD. Each state's regulations have been checked and authenticated by a responsible highway or motor vehicle department official.—**Four Wheel Drive Auto Co., Clintonville, Wis.**

TRAILERS—A 44-p booklet describes in detail the complete line of Rogers heavy-duty trailers. The booklet gives complete specifications of all Rogers trailers from two-wheel dollies to big tilt-deck, multi-axle, detachable-gooseneck models. Accessories for large trailers used for special applications are also included. The booklet is well illustrated.—**Rogers Brothers Corp., Albion, Pa.**

WELDING INFORMATION—The Lincoln Electric Co. has revised its "Weldirectory for Mild Steel and Low-Alloy High-Tensile Steels" to include information on new iron powder and other electrodes. The bulletin provides a description of each electrode, its physical properties and chemical composition, recommended welding procedures, reference tables, and a list of typical applications for each electrode.—**Lincoln Electric Co., Cleveland 17, Ohio.**

LIGHTWEIGHT SHEETING—Specifications and uses of lightweight steel sheet piling for protection of light-load excavations are described in a new 4-p two-color, photo-illustrated bulletin. The bulletin describes Foster's box-type corrugation and interlock design, driving heads for use with standard air hammers, and pulling tongs. Illustrations show the use

GASOLINE **BARCO** RAMMER



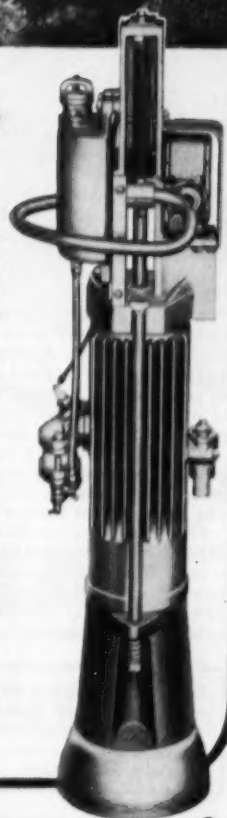
Evidence of the high standards of construction maintained by The Austin Company can be seen in the use of Barco Rammers in this picture. The Austin Company has many Rammers in use on building projects throughout the country.

SOIL
by
BARCO
COMPACTION

Barco Performance Pays Dividends!

Job Finished on Time!—When project specifications call for SOIL COMPACTION, Barco performance can't be beat! In test after test, Barco Rammers have demonstrated their ability to deliver 95% to 97.5% compaction (modified Proctor Method)—RAPIDLY! EFFICIENTLY! ECONOMICALLY! The Barco Rammer is especially effective for compacting fill in restricted areas—close to walls, culverts, abutments, around footings, and in trenches—on all kinds of construction jobs: Atomic Energy, Air Bases, Hydroelectric Power and Flood Control Dams, Highways, Toll Roads and Freeways, Bridges, Buildings, and Housing Developments. On area tamping, one man can average 20 to 30 cubic yards of fill per hour. On trench backfill, using lifts up to 24", the rate for 18" trench is 360 to 600 feet per hour.

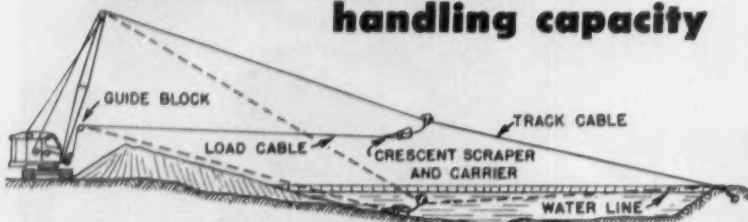
Ask for a Demonstration—We will be glad to arrange a demonstration for you; see our nearest distributor or write. SEND FOR A COPY OF CATALOG 621.



BARCO Manufacturing Co.
512J Hough Street • Barrington, Illinois

the SAUERMAN METHOD...extends the reach of your crane

the CRESCENT SCRAPER...increases its handling capacity



Drawing shows crane using Crescent Scraper and carrier with a track cable. This arrangement increases effective digging range and permits gravity return to the excavation for a faster operating cycle. Maximum operating span is governed only by amount of cable that may be reeved on the drag drum.

Use This Fast, Economical Method For:

Cleaning Ponds
Trenching Streams
Sludge Removal

Cleaning Under Bridges
Building Reservoirs
Beach Construction

Any crane can handle a Crescent Scraper larger than its regular drag-line bucket. Smaller units can increase their capacity about 50%. Large cranes can usually double their capacity. When the boom is supported by a strut or outrigger, a Crescent of still greater size can be used. Arrangements of this type have increased rated crane capacity as much as 4 to 1.

The Crescent hauls its load on the ground and the load is automatically deposited when the bucket is raised. Only the empty scraper bucket is lifted by the crane.

When a crane is equipped with a track cable, Crescent and carrier, it can reach farther, dig deeper under water or from soft areas without the nuisance of mats. Anchorage for the track cable may be fixed—or movable to provide easy shifting to a new line of operation. A tractor makes an excellent mobile anchorage.

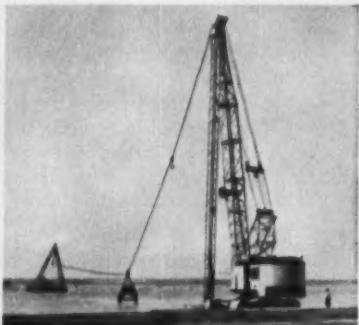
Although the track cable method is best for increasing your machine's range, the Crescent can also be cast like your regular bucket.

Get the facts on how much the capacity of your crane can be increased. Give us the make, model and boom length. Ask for Field Report 228 and Catalog J. Catalog T tells how to use Crescents with tractors.

Important to Users of Blocks and Fittings: Get the new Sauerman bulletins showing the complete line of Wire Rope Fittings and Duralite Sheaves available from stock. Ask for Bulletins 164 and 165.



This Indiana contractor used the track cable method with a 14-cu. yd. Crescent Scraper to trench across a river. After the water main was placed, the scraper backfilled the trench.



Boom support enabled this crane to use a larger Crescent. After a sub-grade of coral was placed, the 4-yd. scraper was reversed and used to grade the beach. Barge-mounted winch served as anchorage for track cable and supplied power to scraper on grading operations.

SAUERMAN

BROS., INC. 612 SO. 28th AVE.
BELLWOOD, ILL.

Crescent Scrapers • Stockline and Tautline Cables • Duralite Blocks

NEW PUBLICATIONS...

Continued

of Foster piling for shore protection, sump pits, pier protection, cut-off walls, and other applications.—L. B. Foster Co., P. O. Box 1647, Pittsburgh 30, Pa.

J&L ROPE MANUAL—A revised edition of the Jones & Laughlin Steel Corp.'s manual on wire rope has just been completed. The 96-p manual, entitled "Wire Rope is a Machine," contains information on the selection, installation, and best operating practices for wire rope. Included is new material on the application of J&L Klamps and J&L Flex slings.—Wire Rope Div., Jones & Laughlin Steel Corp., Muncy, Pa.

AEROQUIP REPLACEMENTS—A new, condensed catalog lists hose, fittings, socketless kits, and self-sealing couplings. Prepared for use in ordering Aeroquip parts for replacements, the booklet contains ordering, assembly, and installation information on Aeroquip's standard industrial products. Ask for catalog No. 174.—Aeroquip Corp., Jackson, Mich.

CRUSHER PLANTS—A new brochure gives ideas for the design and construction of portable and semi-portable rock crushing and screening plants employing Symons cone crushers and vibrating screens. The Portable Plant Handbook contains engineering drawings for nine different plants. A specification sheet accompanying each drawing lists the equipment needed to achieve various production capacities.—Nordberg Mfg Co., Milwaukee 1, Wis.

CONCRETE FORMS—A new 24-p catalog lists details of concrete forming equipment manufactured by Symons, including all-wood panels, steel ply panels with steel cross members, H-form, champ-form, and mag-ply panels, and steel strut wide panels. The company's line of hardware is also described. On-the-job photos and detailed drawings and specifications are included. A special section is devoted to facts about safety shores and Ever-Square column clamps, basic items in the Symons line.—Symons Clamp & Mfg. Co., 4249 Diversey Ave., Chicago 19, Ill.

AIR HOSE—Goodrich air hose is described in a new 2-p bulletin. Types covered include Maxecon,



B504

40% MORE OUTPUT

$\frac{1}{2}$ CU. YD.

DEMAG FULL HYDRAULIC EXCAVATOR

- **THIS SHOVEL THINKS FOR YOU!**
Digging force and working speed adapt themselves automatically to ground resistances.

- **CONSTANT POSITIVE DIGGING FORCE**
throughout full working range.

- **CONTROL FOOLPROOF AND SIMPLE**
To be operated by unskilled personnel.
Full-vision cab.

- **UNUSAL MANOEUVRABILITY**

Fast and responsive travelling, spin turns can be made on the spot by reversing one track and keeping the other in forward speed.

- **LONGER LIFE GUARANTEED**

through operation free from impacts even under toughest working conditions. Trifling spares requirement. No clutches, no brakes.

Powered by a 42-hp air-cooled Diesel engine.
ASK FOR DBF INFORMATION BULLETIN AND
BULLETIN No. DB 2008.

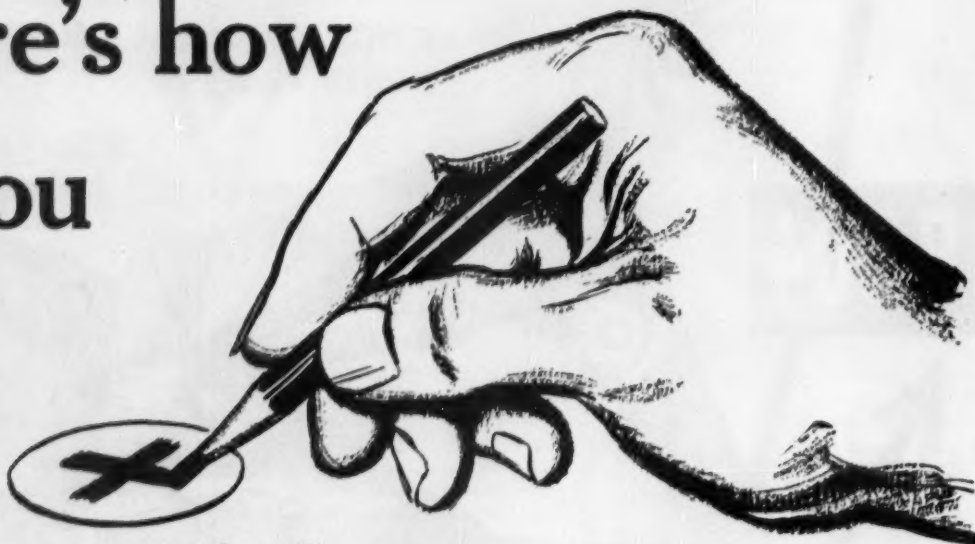
DEMAG

FULL-HYDRAULIC EXCAVATOR

DEMAG BAGGERFABRIK GMBH

**DÜSSELDORF
BENRATH**

here's how you



“govern” the government

Much as we revere and respect this system of ours, we don't want the government running our lives.

The best government is one that's closest to the people. And there's just one way to keep it under control.

Vote.

Every time you get a chance.

Vote November 6, for sure.

Vote to elect the ones you want representing you. To keep the ones who are doing you proud. To get rid of the ones who are not so hot.

You're the boss, however you vote. No matter who's elected, you pay their salaries and paint their offices and keep watching over them as they work.

Even if the ones you're “agin” happen to win, they're obligated to the minority, too. They're servants of *all* the people, not just those who voted for them.

Your vote prods, approves, protests, demands, restrains, rewards.

Vote—so you and your children after you always can.



See You at the POLLS!

LAYKOLD Weathercoat



**-a "permanent
poncho"
for exposed
insulation**

If you have "hot" or "cold" tanks, towers, vessels or piping exposed to the weather, you know the problem. Insulation must be kept dry to be effective. Weathercoat is the answer.

High-efficiency insulation insurance

Laykold Weathercoat is the best "raincoat" your units could have because it seals out not only water but also water vapor. In addition, Weathercoat stays "alive" through season after season.

Write for full details.

**AMERICAN
Bitumuls & Asphalt
COMPANY**

200 BUSH STREET
SAN FRANCISCO 20, CALIFORNIA

NEW PUBLICATIONS . . .

Continued

and all-purpose hose for use as air, water or gasoline line; High-flex, recommended for small shop tools; Type 50, recommended for tie tamping, compressors, mining and other general uses; Commander, recommended for rugged uses; and Type 88, an air, manifold and jetting hose recommended for heavy-duty service.—**B. F. Goodrich Industrial Products Co., Akron, Ohio.**

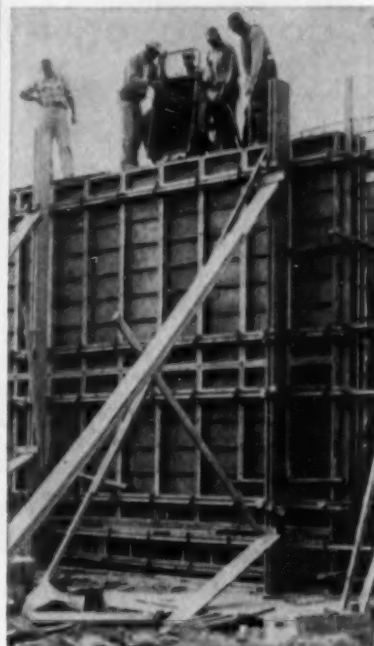
TUNNEL HISTORIES—Case histories of the excavating and concreting problems encountered and solved on 12 tunnel jobs are given in a new 28-p catalog. Among the projects covered are the Hydro-Quebec Bersimis job and its unique concrete requirements; The Aluminum Co. of Canada's Kemano project with its huge underground powerhouse; and the extreme water and heat conditions encountered at a Tecolote, Cal., tunnel. These and nine other jobs used Pozzolith to solve unique concreting problems.—**Masters Building Co., 7016 Euclid Ave., Cleveland 3, Ohio.**

FIRST AID—A new 6-p catalog of various first aid kits available from E. D. Bullard Co., includes a "First Aid Card" containing the latest information on first aid treatments. Bullard kits are custom designed to fit the specifications of any new job. More than 100 kits are available.—**E. D. Bullard Co., 275 Eighth St., San Francisco 3, Calif.**

SYNTRON EQUIPMENT—A condensed 50-p catalog contains information on the complete line of Synttron equipment. Technical data, brief descriptions, and photographs are given on vibrators, feeders and screens, diesel pile hammers, and power tools.—**Synttron Co., 500 Lexington Ave., Homer City, Pa.**

KOEHRING CRANES—"Cranes for Industry" is the title given to a new bulletin that presents a discussion of Koehring's complete line of crawler and rubber tire-mounted cranes for use in industrial material handling work. The new bulletin presents a series of action pictures that show Koehring cranes working in storage yards, stockpiles, and in other material handling operations.—**Koehring Co., Milwaukee 16, Wis.**

Symons FIELD REPORT...



Pouring Costs Cut 25% with Symons Forms . . .

Joseph R. Farrell, Inc., Philadelphia, general contractor, saved more than 25% in pouring costs on the new Cardinal Dougherty High School through the use of Symons Forms. 5,522 feet of Symons Forms were purchased for the job, and were used more than eight times. A total of 50,000 square feet of forming was erected for the 1600 yards of concrete.

Contributing to the speed and economy of the pouring was the use of 2" x 12" strong backs. The strong backs were held in place by 12" standwall ties used as strong back ties to make the horizontal joints stay plumb for the 18 and 20 foot walls. The strong backs permitted continuous pouring of the foundation walls.

With your plans, our engineers will prepare a complete form layout, bill of materials, and make recommendations for the most efficient and cost saving method of forming.

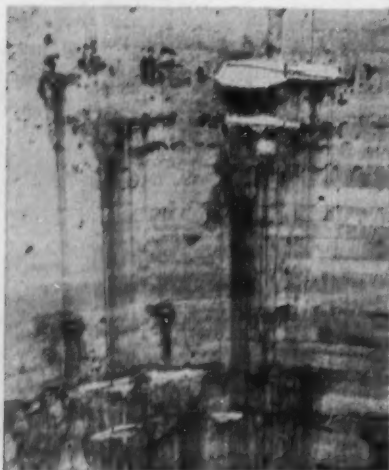
Symons Forms can be rented with purchase option. Symons Clamp & Mfg. Co., 4255 Diversey Avenue, Dept. H-6, Chicago 39, Illinois.

Workmen strip forms while a new pour is started.



Catalogs and Added Information on
FORMS—CLAMPS—SHORES
Sent on Request

A grain elevator gets a good going over, *INSIDE, OUTSIDE!*



COMPLETE BREAK-THROUGH IN WALL

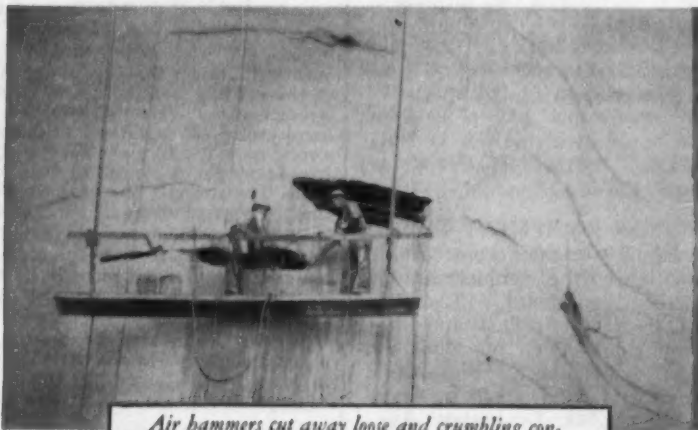
How to save this costly structure, without rebuilding sections, presented a serious problem.

Workmen on scaffolds, from inside and outside, cut out deteriorated concrete.

Necessity of costly forming was eliminated by the use of THORITE 20-minute set, nonshrink, filling and patching mortar.

THORITE

THORITE permits completion of job in one fall of scaffold, followed immediately by THOROSEAL seal coat.



Air hammers cut away loose and crumbling concrete. THORITE formed into cleaned-out sections, with a minimum labor cost, restored elevators to original condition.

Job completed with the application of THOROSEAL over entire structure.

Get our 16-PAGE CIRCULAR

STANDARD DRY WALL PRODUCTS, INC.
NEW EAGLE, PA. • CENTERVILLE, IND.



CONTRACTS AWARDED...

Continued from page 28

synthesis plant, Lake Charles, La. for Petroleum Chemicals, Inc. (Continental Oil Co. and Cities Service Co.), Lake Charles, La. \$15,000,000.

Roscoe Engr. Corp. & Charles Rose, 1107 19th St. N. W., Wash., D. C. Aircraft launching and recovery test center, Naval Air Station, NOY 91177, Spec. 49797, Lakehurst, N. J. Dpt. Navy, Phila. Naval Base, Phila. Pa. \$11,429,000.

Bryant & Detwiler Co., 2110 Penobscot Bldg., Detroit, Mich. A 45,000-sq ft office, Southfield and Rotunda Sts., Dearborn, Mich. for Ford Motor Co., P. O. Box 117, Dearborn, Mich. \$7,000,000.

Gust K. Newberg Constr. Co. 2040 Ashland Ave., Chicago, Ill. Sewage treatment plant, various bldgs., interceptor sewers, at Louisville, Ky. for Louisville & Jefferson County Metropolitan Sewer Dist., 412 W. Market St., Louisville, Ky. \$5,064,000.

EASE OF MAINTENANCE...

Continued from page 61

- Reduction of lubrication frequency by improved methods and grease fittings.
- Standardization of lubrication and servicing frequency and the establishment of a color code to indicate frequency, and perhaps amount, of lubrication.
- Standardization of grease fittings recess hole sizes to insure lubrication with available equipment.
- Standardization of drain, level, and filler plugs.
- Maximum use of unit assemblies.
- Use of quick disconnects and fasteners as well as standardization of cap screws, nuts, and bolts sizes.
- Arrangement of components to facilitate adjustment, repair, and replacement.
- Establishment of a standard ease of maintenance scoring system for guidance to design engineers to insure that ease of maintenance features are incorporated in the initial stages of design.

Bury it!

Forget it!

Yes, here's a Sump Pump that you can bury . . . forget it . . . and run it for days. A dry sump cannot hurt this pump. For pumping more liquids . . . faster . . . higher . . . cheaper . . . use an Ingersoll-Rand air operated Sump Pump.

These pumps are powered by Ingersoll-Rand "Multi-Vane" air motors which have an unequalled reputation for reliability. Put these dependable Sump Pumps to work for you earning extra profits. They will pump as much as 340 gallons per minute and will handle heads up to 150 feet.

This Ingersoll-Rand centrifugal type Sump Pump is the cheapest way to move water, oil, sewage or medium sludge. It's air operated for economy. No need for a standby operator. It consumes a minimum of air. On heads of more than 40 feet air consumption is as much as 30% less than comparable units.

Write today for complete money saving information on this remarkable Sump Pump.



Size 250 Sump Pump.



Size 35
High Head
Sump Pump.

The I-R air operated Sump Pump is available in Sizes 250 or 35. Both types are lightweight for easy carrying by one man. They use dirt-and-liquid-protected bearings for the impeller and motor rotor. All parts are made of bronze, stainless steel, or rust-proofed steel. The Size 250 can also be supplied with an all-bronze exterior when used in corrosive or inflammable liquids.

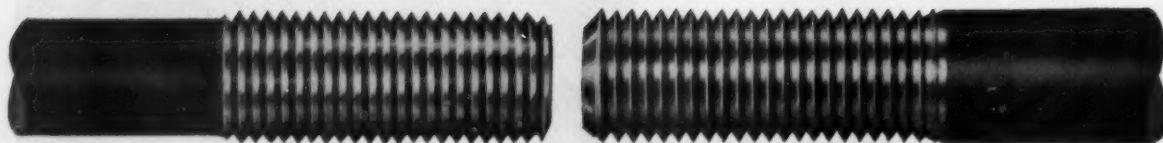
use the  **CONTRACTORS'**
COMBINATION

18A-293

Ingersoll-Rand

11 Broadway, New York 4, N. Y.

ROLLED or CUT THREADS?



Answers to questions we're often asked

Q. What is the important difference between cut and rolled threads?

A. A rod with a cut thread has an outside thread diameter which is the same as the body of the rod. Also, the end of the rod is usually pointed to remove the sharp starting thread.

Rolled threads have an outside diameter greater than the diameter of the portion of the rod next to the thread. And the end of the thread need not be pointed because a sharp starting thread is not present on a rolled thread.

Q. Which type of threads is better?

A. That's hard to say. But rolled

threads are often the better choice. There are several reasons:

1. In many instances, rolled threads are cheaper. This is true because of the weight savings. You buy less steel. Also, rolled threads can often be produced faster. The savings to the customer on the larger sizes is often substantial.

2. Rolled threads are likely to be smoother. And because cold-working hardens the threads, they are not as easily damaged. The cold-working also develops compressive stresses in the threads, making them more resistant to fatigue from repetitive stresses in bending or tension.

3. Because the thread-rolling process "cold-works" the steel in the threads, rolled threads have a slightly higher tensile strength than cut threads. This advantage, however, diminishes as the diameter of the rod or bolt increases.

Q. How can I be sure that rolled threads are the best choice for a particular application?

A. To learn the answer to this question, all you need do is get in touch with the nearest Bethlehem sales office. We'll be pleased to have one of our engineers call at your convenience, to study your bolting problem, and offer recommendations.

Here are the facts. The table below compares various standard rod sizes and shows the weight savings possible when rolled threads are used instead of cut threads.



COARSE THREAD Size	ROLLED THREAD STOCK diam in.	WEIGHT lb/ft	CUT THREAD STOCK diam in.	WEIGHT lb/ft	WEIGHT SAVINGS pct	STRESS AREA sq in.	MINIMUM BREAKING LOAD* lb
¼-20	0.213	0.121	0.240	0.155	21.8	0.0318	2050
⅜-16	0.330	0.291	0.365	0.358	18.7	0.0775	5050
½-13	0.445	0.529	0.490	0.647	18.2	0.1419	9200
¾-10	0.676	1.222	0.740	1.475	17.1	0.334	21700
1 - 8	0.908	2.196	0.990	2.640	16.8	0.606	39400
1 ¼- 7	1.144	3.504	1.235	4.110	14.8	0.969	63000

*Minimum breaking load for cut threads is based on ASTM Spec. A-306, Grade 65, which has a minimum tensile of 65,000 psi. Breaking loads for rolled threads of same grade will be about 5 pct higher. For other grades of steel, breaking load of cut or rolled threads is in proportion to the tensile strength of the steel.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation
Export Distributor: Bethlehem Steel Export Corporation

BETHLEHEM STEEL



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Two-Gun Malsbary 300 Makes Short Work Of Equipment Cleaning



Hard-hitting hot solution (right) cuts grease and dirt off "Euc" while man at left cold-rinses cab. Note effective, jet-like streams—no billowing, no work-hiding fog. For indoor-outdoor use, Savin locates Malsbary 300 just inside shop.

To keep 222 pieces of heavy equipment rolling, Savin Construction Company, East Hartford, Conn., works a tight maintenance schedule. Its fast timetable depends on a two-gun Malsbary 300 HPC (high pressure combination) cleaner. This lets two men work hot solution and cold rinse simultaneously to clean and degrease on-the-double. Says Supt. Ira Davidson:

"With this enormous investment to protect, our Malsbary has paid for itself many times over. In winter, equipment is covered with ice, frozen mud, hard grease and grime—pretty tough to get off but the 300 does a dandy job... enables us to set up a schedule with little downtime."

4 Years without Trouble

"We use our Malsbary 300 from 7 a.m. 'til 5 or 6 at night...bought it 4 years ago and have had no maintenance trouble at all with it. It requires no attention other than starting and stopping and setting up the hot solution mix. Also, it's nice to know replacement parts, if needed, can be procured immediately." (Malsbary has over 175 Authorized Service Centers conveniently located.)

Only Malsbary 300 and 500 Series cleaners deliver high pressure hot solution and high pressure cold water rinse simultaneously for heavy work loads.

Keep your equipment on the job

Why let cleaning slowdowns balloon your in-shop time? The right size cleaner for your work load is the cheapest cleaner for you to buy. Ask your Malsbary dealer which model will do the most efficient, economical job for you. Have him demonstrate it on your job now, or write today for free catalog.



Brown County, Wis., Highway Dept. cleans tractor treads, other equipment, with mobile Malsbary 250 HPC.

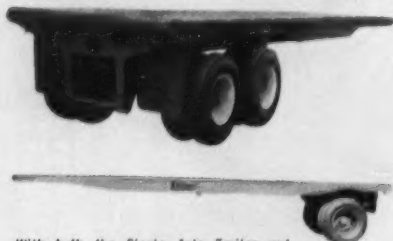


Room C8, 845 92nd Avenue, Oakland 3, Calif.

Get Heavy Duty Payloads

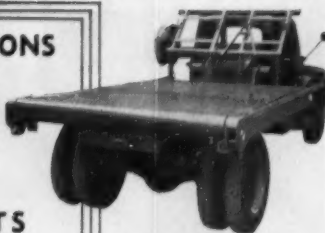
Regardless of JOB CONDITIONS
with

"PACKAGED UNIT"
and other famous Leland bodies
SELF-LOADING FLOATS



With both the Single Axle Trailer and the Tandem Float, one man, unassisted, can load and move heavy machinery and equipment. Both are constructed for maximum safety and rugged dependability.

Plus—Single and Tandem Axle Pipe Trailers—Fifth Wheel Bodies.



Leland

"packaged unit"

The real work-horse of construction equipment, Leland's "packaged unit" is world-famed for hauling, gin pole winching, towing, —any field job demanding the utmost in performance.

**FAST-COMPLETE
PARTS-SERVICE
ON
ALL TRUCK EQUIP-
MENT AND
TULSA WINCHES**

(Advertisement)



Constructing the recently completed Jamaica Bay Crossing of the New York City rapid transit line to Rockaway, Long Island. A McKiernan-Terry S10 Single-Acting Pile Hammer being set in position to drive one of the 900 precast reinforced concrete piles 24-in. square with lengths ranging from 40 to 70 ft. McKiernan-Terry S5 Single-Acting and 10B3 Double-Acting Hammers operated from floating rigs were also used to drive 4,100 wooden piles for the approach and bridge piers, fender system and cofferdams. The McKIERNAN-TERRY CORPORATION, 110A Richards Avenue, Dover, N. J.

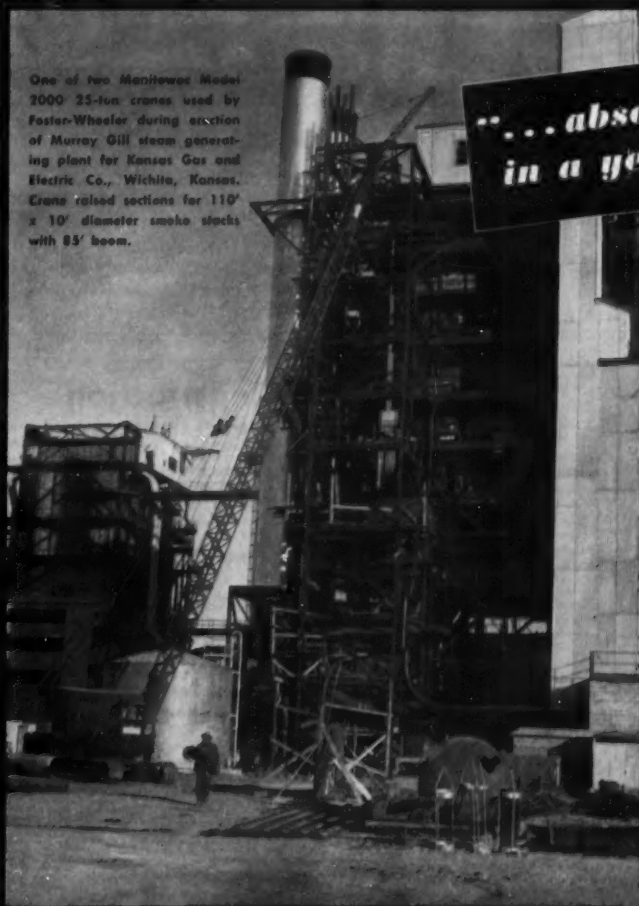
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One of two Manitowoc Model 2000 25-ton cranes used by Foster-Wheeler during erection of Murray Gill steam generating plant for Kansas Gas and Electric Co., Wichita, Kansas. Crane raised sections for 110' x 10' diameter smoke stacks with 85' boom.



"...absolutely no maintenance in a year-and-a-half..."

Manitowoc crane is "perfect"

... says Field Superintendent

"As far as Manitowocs are concerned, I'd rather use them than any crane I've come in contact with!" That's Mr. S. C. Townsend, a Field Superintendent for the Foster-Wheeler Corp., referring to a 25-ton Manitowoc Model 2000 crane he uses — one of 30 Manitowocs owned by Foster-Wheeler. Here's more sincere praise Mr. Townsend has for Manitowoc cranes . . . "They never have given us any trouble. My operators say they are the easiest on the market to operate. Manitowocs seem to have plenty of horsepower for anything we attempt to do. One of the 2000 machines has had absolutely no maintenance on it, except to change oil, in the year-and-a-half we have owned it. It has been perfect. I appreciate the fast, courteous service I get from Manitowoc."

Why not put a Manitowoc to work on your next job? A phone call to your helpful Manitowoc distributor will bring full details and specifications. Contact him *now* before your next important bid!

Manitowoc Engineering Corp. Manitowoc, Wis.

"...easiest to operate..."

Disc type swing and travel clutches give smooth, pin-point control without grabbing or jerking. Optional air controls and power-smooth torque converter make any Manitowoc the "operator's friend".

"...plenty of horsepower..."

Simplicity of main machinery design adds horsepower where it's needed. Just 13 gears and pinions in the Model 2000 machine . . . only working gears turn. Exclusive sliding pinion arrangement uses only one set of clutches to drive travel, swing and boom hoist.

"...never any trouble..."

Finest quality construction with special alloy steels used at all points of greatest wear. Maintenance is easy for simple servicing in the field with minimum downtime.

"...fast, easy convertibility..."

Conversion to 1 1/4-yd. shovel and trench hoe, and long-reach dragline is quick and simple with same back hitch arrangement. Except for drum laggings, all changes need only pin connections.



MANITOWOC

SHOVELS
1-5 1/2 YD.



CRANES
20-100 TON

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Must be graduate civil engineer with minimum 5 years' well-rounded engineering experience. Liberal salary plus allowances and generous benefits.

Write outlining personal history and work experience. Please include telephone number.

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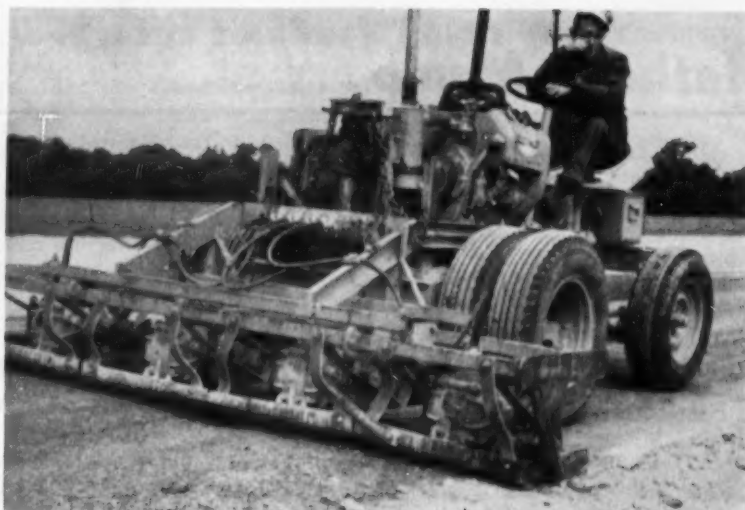
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don't vote
in the dark

Study the issues and the candidates
and then decide where you stand



JACKSON MULTIPLE COMPACTOR PROVED ON HUNDREDS OF PROJECTS

THE FASTEST, MOST ECONOMICAL AND
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UNITS IN STANDARD WORKHEAD DE-
LIVERS 4200 TWO-TON BLOWS PER
MINUTE.

The Jackson Multiple will save you many,
many times its cost in time and money.
See it at your nearby distributor. His
name and literature on request.



The photo above shows the perfect adaptability of the Jackson Multiple Compactor to pavement widening by grouping and towing individual compacting units at the side of tractor for one-pass, complete consolidation on practically every project. At left, see how the end unit on a base compacting job assumes the correct position without adjustment to contain and compact the base edge simultaneously with horizontal base compaction.

Furthermore, individual units may be fitted with operating handles and used exactly like the highly popular, standard Jackson Manually Guided Compactors for getting into the tight places that no other mechanical compactors will reach.

JACKSON VIBRATORS, INC. LUDINGTON MICHIGAN

Methods Memo . . .

The Big Spin

The same skilled crew that spun the suspension cables for the Walt Whitman Bridge over the Delaware River (CM&E, March, 1956, p. 58) now is at work on the biggest job it ever tackled—spinning the cables for the Mackinac Bridge, the longest suspension bridge in the world.

It will be a round-the-clock operation in order to complete the job before winter cold halts operations. Strings of lights for night work will light up the bridge like a huge Christmas tree.

And what a job! In all, there will be 41,000 mi of wire—12,876 wires in each cable. Each cable will be 24½ in. in dia when compacted.

A simple, but effective safety measure will warn bridgemen when one of the four spinning wheels starts its run from one 552-ft-high tower to the other. Each of the rigs carries an ordinary cowbell to alert workers when it begins to move.

Cheaper Cement?

You may be able to buy cement for substantially lower prices soon. There's no let-up in demand and supplies still are tight in most parts of the country. But Allis-Chalmers has developed a new manufacturing process with great promise.

Marquette Cement Manufacturing Co. will install the Allis-Chalmers plant in its new factory in Milwaukee, Wis. But already the process has been proved out in an Allis-Chalmers pilot plant.

Advantages of the process are extremely low dust—less than 1%—fuel savings that amount to

10 to 20¢ per bbl, and factory space savings of up to 40%. With this process it will be possible to manufacture cement in urban areas where conventional plants would not be allowed to operate.

For a Good Cause

We're proud to have played a part in mobilizing support for the 13-year highway program approved by Congress this year. And, of course, we're happy to have our contribution recognized so generously as it is in this letter to CM&E's editor from J. N. Robertson, president of ARBA:

Dear Mr. Perez:

I want to take the occasion of the signing of the Highway Act of 1956 by President Eisenhower to express my personal appreciation to you for the very fine job that you and your publication have done during the past two years in support of the accelerated highway program. I speak for all of the members of the American Road Builders' Association when I say that I am sure your fine support has been a major contribution to its success.

Designed for Digging

A handsome 384-page book detailing the 75-year history of the Bucyrus-Erie Co., world's largest manufacturer of excavating equipment, has just been published by Northwestern University Press. The authors of "Designed for Digging" conclude that "The Bucyrus-Erie history evokes persuasive evidence of a world leadership in the production of power excavators which has played as important a role as the cotton gin, interchangeable parts manufacture, and the assembly line in this nation's rapid conquest of distance and effective utilization of natural and human resources."



◀ BUCYRUS STEAM SHOVEL was almost buried by slide in Panama Canal's Culebra Cut in 1913. This was one of 77 Bucyrus machines working on that job. (From "Designed for Digging")

guide to BETTER CONCRETING*

it pays to check Form Work

Because concrete — especially wet mixes — puts tremendous pressure on form work, forms should be carefully checked before requesting delivery of the concrete. Bracing calls for particular attention.

Adequate studs and walers should be used; also good form ties and rods, rather than job-made baling wire connectors. Forms must be *tight*. Loss of mortar causes honeycombing and creates a patching and finishing problem; loss of water causes sand-streaking.

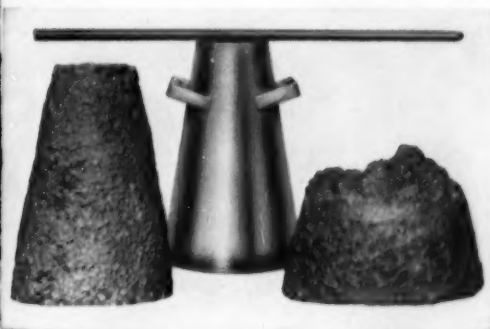
*From booklet by this name. Covers points that can make the difference between a good job and a poor one. Copy on request.



Results like this are costly.

a quiz on CONCRETE

Pozzolith Produces Greater Slump with Same Amount of Water.



PLAIN MIX
6½ Gallons
1 Inch

W/C
SLUMP

POZZOLITH MIX
6½ Gallons
5 Inches

Question: How can required workability be obtained most economically?

Answer: Experience on thousands of jobs has proved that the best and most economical way to obtain required workability is with Pozzolith.

When Pozzolith is added to a plain mix, slump is increased 150% or more. For equal slump, up to 20% less water is required for a Pozzolith mix. Even with reduced unit water content, plasticity is improved, reducing placing and finishing time. As the result of reduced unit water content, the basic qualities in the hardened state are improved.

For uniform, better quality concrete, always specify Pozzolith Ready-Mixed Concrete—available from your local ready-mix producer



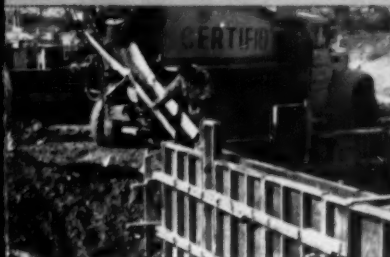
THE MASTER BUILDERS CO.

Division of American-Marietta Company

Cleveland 3, Ohio—Toronto 9, Ontario

Cable Address, Mastmethod, N. Y.

POZZOLITH EMPLOYED FOR IMPROVED CONTROL OF CONCRETE QUALITY



Pozzolith Ready-Mixed Concrete makes available lowest possible unit water content for a given workability . . . for dense, segregation-free foundations and other concrete construction.



With Pozzolith Ready-Mixed Concrete, control of rate of hardening gives desired handling and finishing time under widely varying job conditions . . . for slab and other concrete work.



Control of entrained air, another Pozzolith Ready-Mixed Concrete feature, provides optimum air content without sacrificing other qualities . . . for sewage plants and other exposed concrete.

TIMKEN® bearings cut lubrication checks from once a day to once a month

THIS Cleveland trencher's track rollers used to demand a daily oil check. Now, with Timken® bearings, one check a month is plenty. One reason: because of their high accuracy, Timken bearings keep housings and shafts concentric, allow the use of a more effective lubricant seal. The tapered construction of Timken bearings prevents end play in the track rollers, eliminates pumping action which would pull dirt in, force oil out.

Timken bearings practically eliminate friction in the trencher's rollers.

Their geometrically correct design and precision manufacture give them a true rolling motion. They normally last the life of the machine because they're engineered for the job and made of Timken fine alloy steel.

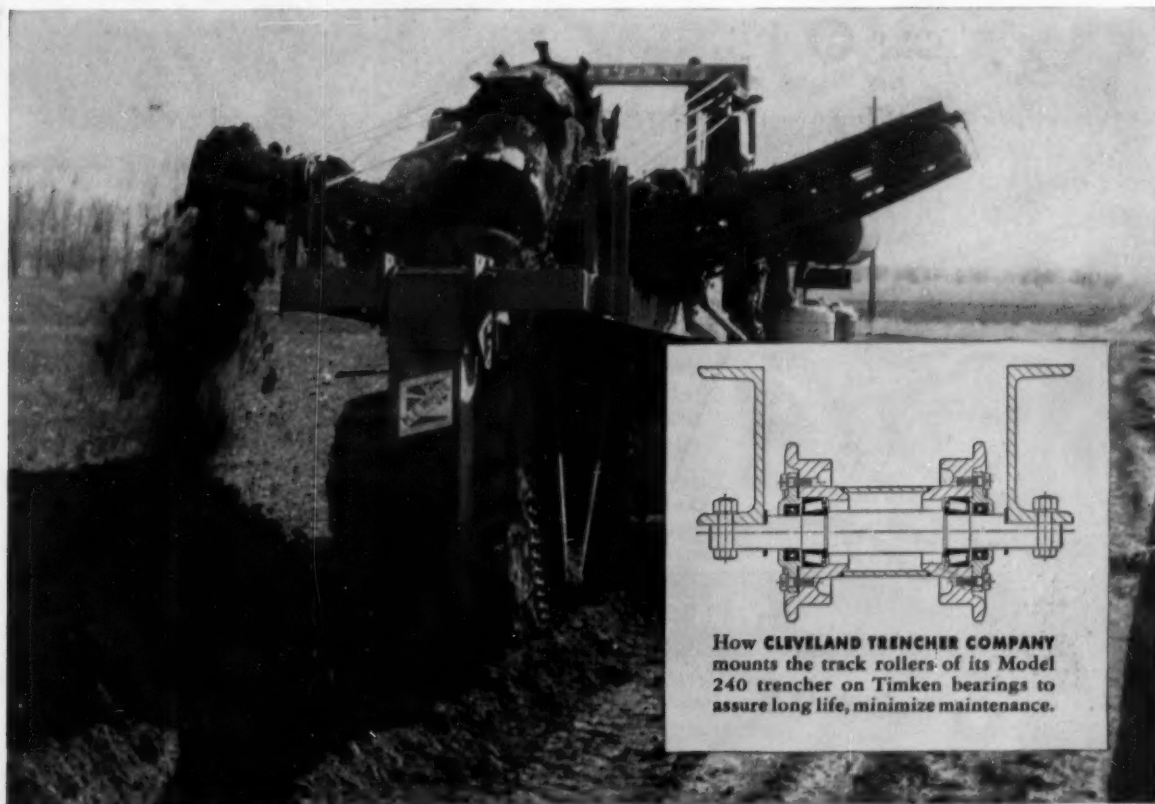
This "240" model trencher can dig a ditch 3' wide and 6' 3" deep at 12 lineal feet a minute along wet right-of-way or up sloping hills. To take the combined radial and thrust loads, 68 Timken bearings were specified for the crawlers, transmission and front upper truck. Because of their tapered design, Timken bearings take

radial and thrust loads in any combination, hold shafts in rigid, positive alignment, assure smooth gear meshing under sudden starts and stops.

Always specify Timken tapered roller bearings when you buy or build machines. Look for the trade-mark "Timken" on the bearings. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian office: St. Thomas, Ont. Cable address: "TIMROSCO".



This symbol on a product means its bearings are the best

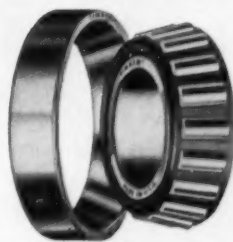


How CLEVELAND TRENCHER COMPANY mounts the track rollers of its Model 240 trencher on Timken bearings to assure long life, minimize maintenance.

REVOLUTIONARY BUCYRUS PLANT HELPS HOLD DOWN RISING COSTS

At a new plant in Bucyrus, Ohio, the Timken Company has substantially reduced the cost of tapered roller bearings by: 1) producing these bearings under a new system of extreme mechanization; 2) standardizing on 13 bearing sizes with the widest applications throughout industry. Manufacturers can take advantage of these lower costs by redesigning applications to use these Bucyrus sizes. And as more switch to Bucyrus bearings, production costs can drop still further, meaning even lower costs to you.

TIMKEN
TRADE-MARK REG. U. S. PAT. OFF.
TAPERED ROLLER BEARINGS



NOT JUST A BALL NOT JUST A ROLLER THE TIMKEN TAPERED ROLLER BEARING TAKES RADIAL AND THRUST LOADS OR ANY COMBINATION